

AD-A022 655

**HEAD-UP DISPLAY SYMBOLOGY**

**William P. Orrick, Jr., et al**

**Naval Air Development Center  
Warminster, Pennsylvania**

**31 December 1975**

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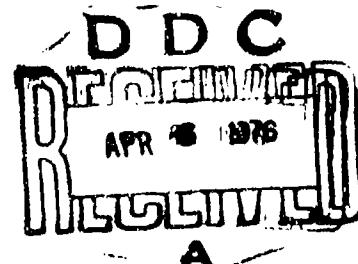
## HEAD-UP DISPLAY SYMBOLOGY

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31 December 1975

PHASE REPORT  
AIRTASK NO. A3400000/001C/6WPN02001  
Work Unit WF55-525-402



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Prepared for  
NAVAL AIR SYSTEMS COMMAND  
Department of the Navy  
Washington, D. C. 20361

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REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER  NADC-75267-40	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOGUE NUMBER
4. TITLE (and Subtitle)  HEAD-UP DISPLAY SYMBOLOGY		5. TYPE OF REPORT & PERIOD COVERED  Phase Report 13 May 75 - 12 June 75
7. AUTHOR(s)  William P. Orrick, Jr. Phyllis E. York		6. PERFORMING ORG. REPORT NUMBER
9. PERFORMING ORGANIZATION NAME AND ADDRESS  Crew Systems Department (Code 4022) Naval Air Development Center Warminster, Pennsylvania 18974		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS  A3400000/001C/6WPNO2001 Work Unit WF55-525-402
11. CONTROLLING OFFICE NAME AND ADDRESS  Naval Air Systems Command Department of the Navy Washington, D. C. 20361		12. REPORT DATE  31 Dec 1975
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)		13. NUMBER OF PAGES  79
		15. SECURITY CLASS. (of this report)  Unclassified
		16a. DECLASSIFICATION/DOWNGRADING SCHEDULE
16. DISTRIBUTION STATEMENT (of this Report)  APPROVED FOR PUBLIC RELEASE; DISTRIBUTION UNLIMITED		
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)		
18. SUPPLEMENTARY NOTES		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number)  Visual display Symbology Head-up display		
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  This report consists of a table and accompanying illustrations which describe aircraft and weapons system functions displayed on the head-up displays in the A-7E, F-5, F-14, F-15, F-111A, CL-84, and AV-8A aircraft. Corresponding display formats as given in MIL-D-81641(AS) and MIL-STD-884B are included for comparison.		

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## INTRODUCTION

The head-up display (HUD) was developed to facilitate the transition between instrument and visual flight. The use of a HUD is becoming increasingly common. In spite of the existence of a Military Specification and a Military Standard which are written to promote consistency and to minimize occurrence of incompatible methods of presenting information, inconsistencies do exist. The following tables were prepared in order to facilitate comparison between existing head-up display formats, so that in the selection of symbols for future head-up displays inconsistencies will be minimized.

The tables included in this report contain data on displays found in the A-7E, F-5, F-14, F-15, F-111A, CL-84, and AV-8A aircraft. Data from the Military Specification pertaining to head-up displays, MIL-D-81641(AS), and the relevant Military Standard, MIL-STD-884B are included. The information in the tables was taken from the references listed. Where available, the NATOPS Manual (U.S. Navy) or Technical Orders (USAF) were considered the primary source. Information from secondary sources was included in the tables where it indicated additional functions or alternative ways of displaying the same functions.

## DESCRIPTION OF THE TABLES

Descriptive parameters are listed at the left edge of the tables. Functions are listed across the top edge. Functions are presented alphabetically and are consecutively numbered. Where there is more than one means of displaying a function for a given aircraft, additional columns are used. The function name is the same, and the same number is used with the notation "(cont)" to indicate continuation of the description. Explanation of the parameters, as necessary, is given below. Blanks in the body of the tables indicate that the parameter is not relevant or the required information was not available.

**Function** - In general, displays present standard aircraft or weapons information and the function names reflect this. There are two types of exceptions. One is where a function is peculiar to an aircraft; e.g., wing sweep in the F-14. The other exception concerns functions without qualifying adjectives where there should be a qualifier. An example is the use of the term "air-speed" without the accompanying "indicated," "true" or "calibrated." In such cases, a separate heading without the qualifier was included in the tables.

**Figure No.** - Refers to the figure which shows the display elements as described in the tables. In order to limit the number of figures, references are sometimes made to a figure showing a display similar to but not identical in format to the display described. For example, the number of scale graduations or intervals may be different, but the relationships among scale marks, numerals, pointers and labels are the same. It is possible to determine from the table entries and the figure how the display looks. Numerals in circles on the figures refer to the function number in the tables. Arrows from these encircled numerals point to display elements which are used for the function

whose number is given. Sometimes a figure number is given in a table entry for a function and the number of that function does not appear on the figure. This is either because the figure portrays only that function, the figure is self-explanatory or the relationship is completely explained in the notes for that function. In some cases, one of the above conditions holds yet there is a numeral on the figure. This is due to the conservative nature of the authors' approach.

**Form of Display** - The components of a functional display, as shown in the corresponding figure, were classified as scales (vertical, horizontal, or circular), ladders, digits, letters, alphanumerics, or symbology.

**Display Label** - Any letter(s) used to label the display are indicated. In the corresponding figure, a single letter has been drawn to indicate the position of a single letter label; two letters have been drawn to show the position of a double letter label. In each case, the letter(s) in the actual label may differ from those used in the figure.

**Range of Variable** - The range of parameter values which may be displayed is given.

**Range Displayed** - The range of parameter values which is displayed at a given time is indicated.

**Direction of Increase** - The direction of increasing parameter values is given in relationship to the appropriate scalar display. For a vertical scale, parameter values increase as one reads up the scale, down the scale, or both; for a horizontal scale, values increase as one reads to the left, to the right, or both. For a circular scale, values increase in a clockwise or a counter-clockwise direction.

**Fixed Scale** - "Yes" indicates the scale remains stationary; "no," the scale acts as a moving tape.

**Scale Values Marked** - "Yes" indicates scale graduations are labeled with numerals to indicate parameter values.

**Scale Graduations** - The change in parameter value for the smallest graduation on a scale is given.

**Moving Reference** - "Yes" indicates a reference mark changes its position on the screen in some manner.

**Modes** - With certain exceptions, modes are listed as named in reference sources (see mode list). In cases where the table entry does not correspond exactly to the mode list, the table entry will encompass more than one mode and will contain the word common to these modes. The only further exception is the use of the word "attack" to include all modes in the A-7H where a weapon is used.

**Notes** - When a function description has been obtained from a secondary reference source (reference 4 or reference 6) this is indicated by inclusion of the source number in the "notes" section.

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<b>Airspeed Command</b>		
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AV-8A	8	6
MIL-D-81641(AS)	9	5
MIL-STD-884B	10	5
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		10
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CL-84	144	1
MIL-D-81641(AS)	145	46
MIL-STD-884B	146	47
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F-15	148	12
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		13
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F-15 . . . . .	173	9
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MIL-STD-884B . . . . .	175	45
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MIL-STD-884B . . . . .	177	5
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F-14 . . . . .	179	0
CL-84 . . . . .	180	1
AV-8A . . . . .	181	19
MIL-D-81641(AS) . . . . .	182	5
MIL-STD-884B . . . . .	183	5
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FUNCTION	TABLE ENTRY	FIGURE
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Wing Sweep Display F-14	193	

NUMBER	1	2	3	4	5
FUNCTION	DISPLAY LATERAL ACCELERATION	DISPLAY LATERAL ACCELERATION	DISPLAY VERTICAL ACCELERATION	DISPLAY VERTICAL ACCELERATION	DISPLAY ACCELERATION LIMIT
AIRCRAFT	CL-84	AV-8A	A-7	F-14	Y-5
FLYING MD.	1	50	2	3	4
FORM OF DISPLAY	horizontal scale	horizontal scale	vertical scale	vertical scale	digital
LOCATION ON HUD	upper center	below center	right edge	left edge	bottom center
DISPLAY LABEL	none	none	none	G	none
RANGE OF VARIABLE	$\pm .39$ G	$\pm 2$ to $\pm 6$ G	$\pm 2$ to $\pm 6$ G	0 to +8 G	
RANGE DISPLAYED	$\pm .06$ G	L & R	up	up	
DIRECTION OF INCREASE					
FIXED SCALE?	yes	yes	yes	yes	
SCALE VALUES MARKED?	no	no	do	no	
SCALE GRADUATIONS		.06 G	1 G	2 G	
MOVING REFERENCE?	yes	yes	yes	yes	
TYPE OF REFERENCE	ball	ball	triangular pointer	letter G	
HOUSES IN WHICH FUNCTION IS AVAILABLE	approach; transition	V/S/TOL	en route navigation; terrain following; attack (all)	all exc. landing missile	
DISPLAY CHANGES WITH HUDE CHANGES	none	none	none	none	
NOTES				ref. 4	

NUMBER	FUNCTION	COMMAND AIRSPEED	COMMAND AIRSPEED	COMMAND AIRSPEED	CROSSWIND AIRSPEED
AIRCRAFT	F-15	CL-84	AV-R/A	MIL-D-81641(AE)	MIL-STD-824B
FIGURE NO.	5	1	6	5	5
FORM OF DISPLAY	vertical scale	symbolic	horizontal scale	vertical scale	vertical scale
LOCATION ON HUD	left edge	lower center	upper edge, left	left edge	left edge
DISPLAY LABEL	none	none	none	AS	
RANGE OF VARIABLE	-100 to 1023 KT		±40 KT	0 to 600 KT	
RANGE DISPLAYED	160 KT		±20 KT	100 KT	40 KT
DIRECTION OF INCREASE	down	up	right	down	down
FIXED SCALE?	no	yes	yes	no	yes
SCALE VALUES MARKED?	yes	no	no	yes	yes
SCALE GRADUATIONS	10 KT		20 KT	10 KT	5 KT
MOVING REFERENCE?	yes	yes	yes	yes	
TYPE OF REFERENCE	horizontal line	diamond	vertical line	caret	caret
EDGES IN WHICH FUNCTION IS AVAILABLE	all	approach; transition	all exec. V/S/TOL, A/A	TO/HAY; IF; bombing; boresight weapons; guided weapons; LDC	770; NAV; 177TA; weapon delivery; landing
DISPLAY CHANGES WITH MODE CHANGES	display position	display approach	none	none	none
NOTES	low resolution changes with gear up/down change	speed error in AFTR, speed in TRAN	diamond to be flown to dot	when caret lines up with fixed index at center of scale, command is satisfied	

NUMBER	11	12	13	14	15
FUNCTION	DISPLAY AIRSPEED	DISPLAY AIRSPEED	DISPLAY AIRSPEED	DISPLAY TAS	DISPLAY TAS
AIRCRAFT:	CL-84	MIL-D-81661(AS)	MIL-STD-8643	A-7	P-14
FIGURE NO.	5	5	7	3	
FORM OF DISPLAY	digital	vertical scale	vertical scale	vertical scale	vertical scale
LOCATION ON HUD	left upper quadrant	left edge	left edge	left edge	left edge
DISPLAY LABEL	none	A	AS	none	none
RANGE OF VARIABLE	0 to 600 KT	100 KT	40 KT	100 KT	100 KT
BLANKS DISPLAYED	none	down	down	up	up
DIRECTION OF INCREASE					
FIXED SCALE?	no	yes	yes	yes	yes
SCALE VALUES MARKED?	yes	yes	no	no	no
SCALE GRADUATIONS	10 KT	5 KT	10 KT	10 KT	10 KT
MOVING REFERENCE?	no	no	yes	yes	yes
TYPE OF REFERENCE		horizontal line	horizontal line	"thermometer"	"thermometer"
HOUSES IN WHICH FUNCTION IS AVAILABLE	approach; transition	TO/XAV; IP; bombing; horisight & guided weapons; landing	T/O; NAV; IP/TIA; weapon delivery; landing	all	all
DISPLAY CHANCES WITH HOME CHANCES	none	none	none	none	none
NOTES	speed displayed also used in transition to indicate ground speed re runway (see no. 7)			numeric at bottom of display indicates hundreds of KT to which scale value is added	numeric at bottom of scale indicates hundreds of KT to which scale value is added ref. 4

NUMBER	16	17	18	19	19 (cont)
FUNCTION	DISPLAY TAS	DISPLAY TAS	DISPLAY TAS	AIR-TO-AIR ATTACK STABILIZING	AIR-TO-AIR ATTACK STABILIZING
AIRCRAFT	F-15	AV-8A	AV-8A	F-14	F-14
FIGURE NO.	5			6	9
FORM OF DISPLAY	vertical scale	digital	digital	symbolic	symbolic
LOCATION IN HUD	left edge	upper edge, left	upper edge, left	reticle in center	
DISPLAY LABEL	none	none	none	none	none
RANGE OF VARIABLE	-100 to 1023 KT	30 to 660 KT	230 to 720 KT		
RANGE DISPLAYED	160 KT				
DIRECTION OF INCREASING	down				
FIXED SCALE?	no				
SCALE VALUES MARKED?	yes				
SCALE GRADUATIONS	10 KT	1 KT	1 KT		
MOVING REFERENCE?	no				
TYPE OF REFERENCE	caret				
HUDS IN WHICH	all	all exc A/A (V/STOL and NAV only in aircraft after ARC 105)	VHSS; VHSSb	A/A Sidestick norm; Sparrow norm; A/A Phoenix norm	A/A Phoenix norm; Sparrow norm
FUNCTION IS					
AVAILABLE					
DISPLAY CHANGES WITH MODE CHANGES	display shifts with gear extension	none	none	note	note
NOTES	low resolution gives 320 KT display range, 20 KT graduations. caret shown in flight mode should be at midpoint of scale	demanded speed displayed at same location when SEL knob pushed. demanded speed can be changed by turning knob. see no. 9. updated 2X/sec	target designator present in side-winder mode; steering info present in Sparrow & Phoenix modes. aircraft reticle and target designator or steering cue mis-alignment is steering command	fly velocity vec- tor to flight director. dot is center of FD in- dicator if target angle of course more than 90° from com- mand	target designator present in side-winder mode; steering info present in Sparrow & Phoenix modes. aircraft reticle and target designator or steering cue mis-alignment is steering command

NUMBER	19 (cont)	20	21	21 (cont)	22
FUNCTION	AIR-TO-AIR ATTACK STEERING	AIR-TO-GROUND ATTACK STEERING	AIR-TO-GROUND ATTACK STEERING	AIR-TO-CROSSO ATTACK STEERING	AIR-TO-CROSSO ATTACK STEERING
AIRCRAFT	F-14	F-15	F-14	F-14	F-15
FIGURE NO.	10	12	13	9	16
TYPE OF DISPLAY	symbolic	symbolic	symbolic	symbolic	symbolic
LOCATION ON HUD					
DISPLAY LABEL	none	none	none	none	none
RANGE OR VARIABLE					
RANGE DISPLAYED					
DIRECTION OF INCREASE					
FIXED SCALE?					
SCALE VALUES MARKED?					
SCALE GRADUATIONS					
MOVING REFERENCE?					
TYPE OF REFERENCE					
SCDS IN WHICH	Sparrow norm; A/A	A/A (missile)	A/C computer-IP	A/C computer-TGT	A/C
FUNCTION IS	Sideviewer norm		A/C computer-TGT		A/C computer-IP
AVAILABLE					
DISPLAY CHANGES	size of dashed reticle changes	none	none	none	none
WITH HOE CHANGES					
NOTES	fixed reticle at ADL. fly moveable reticle into fixed reticle. ASC-14	fly steering dot into ASE circle			azimuth separation of PD and WV indi- ates steering error ref. 4

NUMBER	23	24	25	26	27
FUNCTION	AIR-TO-GROUND ATTACK STEPPING	CARRIER ALTITUDE	COMMAND ALTITUDE	COMMAND ALTITUDE	CARRIER ALTITUDE
AIRCRAFT	F-111A	F-114	F-15	M-220 (AS)	MIL-57D-8843
FIGURE NO.	15	16	17	17	17
FORM OF DISPLAY	symbolic	digital	vertical scale	vertical scale	vertical scale
LOCATION ON HUD		right edge	right edge	right edge	right edge
DISPLAY LABEL	none	none	none	B or R	B or R
RANGE OF VARIABLE			-1000 to 30,000 FT	note	
RANGE DISPLAYED		1500 FT (actual)	1000 FT	1000 FT	1000 FT
DIRECTION OF INCREASE		up	down	up	up
FIXED SCALE?		no	no	no	yes
SCALE VALUES MARKED?		yes	yes	yes	yes
SCALE GRADUATIONS		1000 FT	100 FT (note)	100 FT	100 FT
MOVING REFERENCE?			yes	yes	
TYPE OF REFERENCE			horizontal line	caret	caret
HOURS IN WHICH FUNCTION IS AVAILABLE	command	all	TO/NAV; HI; both- ing; landing	all	
DISPLAY CHANGES WITH MODE CHANGES	none	none	display shifts when gear extended. high resolution.	none	
NOTES	reticle is red; steering bars, green.	Data Link command req. 4 steer bars to pip- per	300 FT display range with high resolution select- ed. 20 FT scale markings with high resolution select- ed.	MAB ALT range -1000 FT to ALT. designated in de- tail A/C SPEC. ra- dar ALT range 0 FT to ALT designated. illustration in SPEC shows larger values at bottom of scale (vice fig- ure 17).	

NUMBER	FUNCTION	DISPLAY BAROMETRIC ALTITUDE	DISPLAY BAROMETRIC ALTITUDE	29 (cont)		30	31
				DISPLAY BAROMETRIC ALTITUDE	DISPLAY BAROMETRIC ALTITUDE		
AIRCRAFT	A-7	F-14	F-14	F-15	F-15	AV-8A	
FIGURE NO.	16	16	16	17			
FORM OF DISPLAY	vertical scale	vertical scale	vertical scale	vertical scale	vertical scale	digital: upper edge, right	
LOCATION ON HUD	right edge	right edge	right edge	right edge	right edge	right edge, right	
DISPLAY LABEL	none	none	none	none	none	none	
RANGE OF VARIABLE	0 to 14000 FT	0 to 14000 FT	0 to 14000 FT	-1000 to 80000 FT	-1000 to 80000 FT	-1000 to 80000 FT	
RANGE DISPLAYED	10000 FT	0 to 14000 FT	0 to 14000 FT	10000 FT	15000 FT (note)		
DIRECTION OF INCLINOMETER	up	up	up	up	up		
FIXED SCALE?	yes	yes	yes	yes	yes		
SCALE VALUES MARKED?	no	yes	no	no	yes		
SCALE GRADUATIONS	100 FT	2000 FT	100 FT	100 FT	100 FT (note)	20 FT (note)	
MOVING MILESTONE	yes	yes	yes	yes	no		
TYPE OF REFERENCE	"thermometer"	caret	"thermometer"	caret	all		
HOUSES IN WHICH FUNCTION IS AVAILABLE	en route navigation A/G Landing					all exc. A/A	
DISPLAY CHANCES WITH MODE CHANGES	none	none	none	none	display shifts with rows		
NOTES				numeric at bottom	300 FT display		
				of scale indicates thousands of feet.	range with high resolution select-		
				ref. 4	ed. 20 FT scale		
					markings with high resolution select-		
					ed.		

30 FT steps 10000  
FT  
range with high  
resolution select-  
ed. 20 FT scale  
markings with high  
resolution select-  
ed.

NUMBER	32	33	34	35	35 (cont)
FUNCTION	DISPLAY BAROMETRIC ALTITUDE	DISPLAY BAROMETRIC ALTITUDE	DISPLAY RADAR ALTITUDE	DISPLAY RADAR ALTITUDE	DISPLAY RADAR ALTITUDE
AIRCRAFT	MIL-D-81641(AS)	MIL-STD-3848	A-7	P-14	P-14
FIGURE NO.	17	17	16	18	16
FORM OF DISPLAY	vertical scale	vertical scale	vertical scale	vertical scale	vertical scale
LOCATION ON HUD	right edge	right edge	right edge	right edge	right edge
DISPLAY LABEL	g		note	none	note
RANGE OF VARIABLE	note		note	1400 FT	
RANGE DISPLAYED	10000 FT	10000 FT	10000 FT	10000 FT	10000 FT
DIRECTION OF INCREASE	down	up	up	up	up
FIXED SCALE?	no	yes	yes	yes	yes
SCALE VALUES MARKED?	yes	no	yes	yes	no
SCALE GRADUATIONS	100 FT	100 FT	100 FT	200 FT	100 FT
HAVING REFERENCE?	no	yes	yes	yes	yes
TYPE OF REFERENCE	horizontal line	horizontal line	"thermometer"	care:	"thermometer"
MODES IN WHICH FUNCTION IS AVAILABLE	TO/NAV; T/T; bombing; landing	all	attack; W	takeoff; landing	sl1
DISPLAY CHANCES WITH MODE CHANCES	none	none	none	none	none
NOTES	-1000 FT to altitude designated in A/C detail SPEC.				numeric at bottom of scale indicates thousands of feet. half box encloses value denotes radar altitude. ref. 4

NUMBER	16	37	38	39	40
FUNCTION	DISPLAY RADAR ALTITUDE	DISPLAY RADAR ALTITUDE	DISPLAY RADAR ALTITUDE	DISPLAY RADAR ALTITUDE	DISPLAY ANGLE OF ATTACK
AIRCRAFT	CJ-84	AV-8A	MIL-D-31641(A5)	MIL-STD-8648	F-15
FIGURE NO.			17	17	3
FORM OF DISPLAY	digital	vertical scale	vertical scale	vertical scale	vertical scale
LOCATION ON HUD	upper R quadrant	upper edge, right	right edge	right edge	left side, lower
DISPLAY LABEL	note	note	R	R	none
NAME OF VARIABLE	0 to 5000 FT	note			0 to 45 units
RANGE DISPLAYED		1000 FT	1000 FT	0 to 45 units	
DIRECTION OF INCREASE		down	up	up	
FIXED SCALE?		no	yes	yes	yes
SCALE VALUES MARKED?		yes	yes	yes	yes
SCALE GRADUATIONS	5 FT	100 FT	100 FT	5 units	
MOVING REFERENCE?		no	no	yes	
TYPE OF REFERENCE	approach; transition	all exc. A/A	TO/NAV; TF; bombing; landing	horizontal line	horizontal line
HOWES IN WHICH FUNCTION IS AVAILABLE				ADL	
DISPLAY CHANGES WITH MOVE CHANCES	none	none	none	none	display shifts with gear extended
NOTES	numerals preceded by C to indicate height above ground altitude	numerals prefixed by 0 FT to altitude designated in A/C detail SPEC.			

NUMBER	FUNCTION	DISPLAY ANGLE OF ATTACK	DISPLAY ANGLE OF ATTACK ERROR	DISPLAY ANGLE OF ATTACK ERROR	43		43 (cont)		44
					41	42	43	43 (cont)	
AIRCRAFT	AV-8A	A-7	F-14	F-14					ATTACK ERROR NTR-D-81641(AS)
FIGURE NO.	19	20	21	20					21
FORM OF DISPLAY	vertical scales	symbolic	symbolic	symbolic					symbolic
LOCATION ON HUD	left edge								
DISPLAY LABEL	none	none	none	none					none
RANGE OF VARIABLE	-5 to 20 units								none
RANGE DISPLAYED	-5 to 20 units								none
DIRECTION OF INCREASE	up								
FIXED SCALE?	yes								
SCALE VALUES NAMES?	no								
SCALE GRADUATIONS	4 units								
HOVING REFERENCE?	yes								
TYPE OF REFERENCE	"thermo" with target								
HOLES IN WHICH FUNCTION IS AVAILABLE	all	all	all	all	landing	landing	landing	none	
DISPLAY CHANGES WITH HOVE CHARACTERS	none	none	none	none	none	none	none	none	
NOTES	displays angle in degrees at airspeeds > 120 KT, units at airspeeds < 100 KT (prior to AFC 105 only).	fly flight path marker away from center of bracket to obtain centering available when ASA > 14 units.	fly A/C to center bar of bracket	fly A/C to center bar of bracket	fly A/C to center bar of bracket, bracket is 4 units high.	ref. 4			

ITEM/CLK	45	46	47	47 (cont)	48
FUNCTION	DISPLAY ANGLE OF ATTACK ERROR	DISPLAY OPTIMUM ANGLE OF ATTACK	DISPLAY ALIGNMENT DATUM LINE	DISPLAY ALIGNMENT DATUM LINE	DATUM LINE
AIRCRAFT	HII-STID-884B	F-15	F-14	F-14	F-15
FIGURE NO.	21	5	22	22	22
FORM OF DISPLAY	symbolic	vertical scale	symbolic	symbolic	symbolic
LOCATION ON HUD		left side, lower	5° above A/C reticle		
DISPLAY LABEL	none	none	none	none	none
NAME OF VARIABLE					
NAME DISPLAYED		0 to 45 units			
DIRECTION OF INCREASE		0 to 45 units			
FIXED SCALE?		up			
SCALE VALUES MARKED?		yes			
SCALE GRADUATIONS		5 units			
HYDRA REFERENCE?		yes			
TYPE OF PREFERENCE		horizontal line			
HOLES IN WHICH FUNCTION IS AVAILABLE	all	ADI	A/A (all); A/G COMP-PILOT (both); A/G manual	A/A: Sidewinder- bore sight; Phoenix- bore sight; Sparrow- bore sight; A/G COMP-PILOT (both)	all
DISPLAY CHANGES WITH MODE CHANGES	none	display shifts with gear extended	none	none	none
NOTES				ref. 4	appears when mis- ter arm on and serves as an in- dicator of master arm status

NUMBER	49	50	51	52	52 (cont)
FUNCTION	DISPLAY ARMAMENT	DISPLAY ARMAMENT	DISPLAY ARMAMENT	DISPLAY ARMAMENT	DISPLAY ARMAMENT
	DATUM LINE	DATUM LINE	SLECTION	SLECTION	SLECTION
AIRCRAFT	AV-8A	MIL-D-81641 (AS)	MIL-STD-884B	F-14	F-14
FIGURE NO.	22	22	22		
FORM OF DISPLAY	symbolic	symbolic	alphanumeric	alphanumeric	
LOCATION ON HUD	at A/C FRL		bottom		
DISPLAY LABEL	none	BS	note	note	note
RANGE OF VARIABLE					
RANGE DISPLAYED					
DIRECTION OF INCREASE					
FIXED SCALE?					
SCALE VALUES MARKED?					
SCALE CLASSIFICATIONS					
NUSTIC REFERENCE?					
TYPE OF REFERENCE					
ARMES IN WHICH	WPNS & WPNS b	bore sight	WPNS delivery	all exc. TU, landing	
FUNCTION IS					
AVAILABLE					
DISPLAY CHANGES	none	none	none	none	none
WITH MODE CHANGES					
NOTES					ORD: bombs or rockets; G: gun; SU: Sidefinder; SP: Sparrow; PH: Phoenix. number under G is number of hundred rounds remaining. number under PH is number of missiles ready
					3 line message: top: type weapon selected middle: ready weapons loaded lower: rounds remaining (100's). ref. 4

NUMBER	53	54	55	56	% (cont)
FUNCTION	DISPLAY ARMAMENT SELECTION	DISPLAY ARMAMENT SELECTION	DISPLAY ARMAMENT SELECTION	DISPLAY ATTITUDE	DISPLAY ATTITUDE
AIR LAFT	XIL-D-31641 (AS)	F-15	MIL-STD-884B	F-14	F-14
FIGURE NO.				23	24
FORM OF DISPLAY	Alphanumeric	Digital	Alphanumeric	Ladder/symbolic	Ladder/symbolic
LOCATION ON HUD		Lower edge; L scale			
DISPLAY LABEL	Note	Note	None	None	None
RANGE OF VARIABLE				190°	190°
RANGE DISPLAYED			80°	20°	
DIRECTION OF INCREASE			Up	Up	
FIXED SCALE?			No	No	No
SCALE VALUES MARKED?			Yes	Yes	Yes
SCALE GRADUATIONS			30°	30°	Note
HAVING REFERENCE?			Yes	Yes	Yes
TYPE OF REFERENCE			A/C reticle	A/C reticle	A/C reticle
WINGS IN WHICH FUNCTION IS AVAILABLE	TF; boresight WPNs; Guided WPNs; bore- sight	A/A (Both); A/C weapon delivery	A/A; cruise	A/G; takeoff; land- ing	A/G; takeoff; land- ing
DISPLAY CHANGES WITH MODE CHANGES	None	None	None	Scale change	None
NOTES	Missile, guns, rockets:	Type and number of missiles, number of missiles ready, number of rounds remaining (100's), number of rockets remaining (10's)			Divisions are 5° up to 230°, 10° thereafter

NUMBER	56 (cont)	57	58	59	60
FUNCTION	DISPLAY ATTITUDE	DISPLAY ATTITUDE	DISPLAY ATTITUDE	DISPLAY ATTITUDE	DISPLAY ATTITUDE
AIRCRAFT	F-14	F-15	F-111A	CL-84	AV-8A
FIGURE NO.	26	25	15	1	27
FORM OF DISPLAY	ladder/symbolic	ladder/symbolic	vertical scale/STM	ladder/symbolic	ladder/symbolic
LOCATION ON HUD			note	see figure 1	
DISPLAY LABEL	none	none	none	none	none
RANGE OF VARIABLE	$\pm 90^\circ$	$360^\circ$	$\pm 10^\circ$ pitch, $360^\circ$ roll	$5^\circ$	$\pm 90^\circ$
RANGE DISPLAYED	$20^\circ$	note	up	up	$50^\circ$
DIRECTION OF INCREASE	up	note	up	up	up
FIXED SCALE?	no	no	yes	no	no
SCALE VALUES MARKED?	yes	yes (note)	no	yes	yes
SCALE GRADUATIONS	$5^\circ$	note	$2.5^\circ$	$5^\circ$	$30^\circ$
MOVING REFERENCE?	yes	yes	yes	no	yes
TYPE OF REFERENCE	velocity vector	A/C symbol	horizontal line	approach; transition	A/C symbol
MODES IN WHICH FUNCTION IS AVAILABLE	all	all	all	none	none
DISPLAY CHANGES WITH MODE CHANGES					
NOTES	ref. 4	scale divisions at $5^\circ$ , numbers up to $30^\circ$ , above $30^\circ$ line spacing compressed. When $90^\circ$ pitch exceeded, numbers decrease toward zero. zenith, nadir, & A/C symbols in FIG. 25. display as in FIG. 26, exc. signs missing	pitch indicator represents deviation from value preset by pilot. roll available in all modes; pitch, in manual.	pitch indicator represents deviation from value preset by pilot. roll available in all modes; pitch, in manual.	pitch indicator represents deviation from value preset by pilot. roll available in all modes; pitch, in manual.

NUMBER	61	62	63	64	65
FUNCTION	DISPLAY ATTITUDE	DISPLAY ATTITUDE	COMMAND BANK ANGLE	DISPLAY BANK FALL LINE	DISPLAY BORE SIGHT LINE
AIRCRAFT	MIL-D-81641(AS)	MIL-STD-8848	F-14	A-7	F-14
FIGURE NO.	26	26	23	13	13
FORM OF DISPLAY	ladder/symbolic	symbolic	symbolic	symbolic	symbolic
LOCATION ON HUD					
DISPLAY LABEL	none	none	none	none	none
RANGE OF VARIABLE	$\pm 90^\circ$				
RANGE DISPLAYED	$30^\circ$	$30^\circ$			
DIRECTION OF INCREASE	up	up			
FIXED SCALE?	no	no			
SCALE VALUES MARKED?	yes	yes			
SCALE GRADUATIONS	$5^\circ$	$5^\circ$			
HAVING REFERENCE?	yes	yes			
TYPE OF REFERENCE	A/C reticle	A/C reticle			
NODES IN WHICH FUNCTION IS AVAILABLE	all exc. boresight	all	attack; landing; A/G	attack modes exc. guns, rockets	A/C COMP-TCT; A/C COMP-PILOT (both) A/C COMP-IP
DISPLAY CHANGES WITH RIDE CHANGES	pitch lines absent in TF	none	none	none	none
NOTES	A/C reticle shown in FIG. 26. pitch lines marked every $10^\circ$ (with first digit). negative sign present	ref. 4	parallel to or co- incident with a line between FTH and impact point		

NUMBER	66	67	68	69	70
FUNCTION	DISPLAY BOMB FALL LINE	DISPLAY BOMB FALL LINE	DISPLAY BOMB FALL	COMMAND BREAKAWAY	COMMAND BREAKAWAY
AIRCRAFT	F-15	MIL-D-81641(A5)	MIL-STD-884B	A-7	F-14
FIGURE NO.	13	13	13	29	29
FORM OF DISPLAY	symbolic	symbolic	symbolic	symbolic	symbolic
LOCATION ON HUD					
DISPLAY LABEL	none	none	none	none	none
RANGE OF VARIABLE					
RANGE DISPLAYED					
DIRECTION OF INCREASE					
FIXED SCALE?					
SCALE VALUES MARKED?					
SCALE GRADUATIONS					
NOTING REFERENCE?					
TYPE OF REFERENCE					
HODES IN WHICH	A/G	Boozing	weapon delivery	attack; IP; land-	cruise vector; A/R
FUNCTION IS				ing	optical track; A/A
AVAILABLE					sonar; all A/C
DISPLAY CHANGES	none	none	none	none	excl. manual; land-
WITH MODE CHANGES					ing/AML; LGS/vector
NOTES					

NUMBER	71	72	73	74	75
FUNCTION	COMMAND BREAKAWAY	COMMAND BREAKAWAY	COMMAND BREAKAWAY	COMMAND BREAKAWAY	COMMAND CLOSURE RATE
AIRCRAFT	F-15	A7-SA	MIL-D-81641(AS)	MIL-STD-8848	MIL-D-81641(AS)
FIGURE NO.	29	29	29	29	17
FORM OF DISPLAY	symbolic	symbolic	symbolic	symbolic	vertical scale
LOCATION ON HUO	note	note	note	note	right edge
DISPLAY LABEL	none	none	none	none	C
RANGE OF VARIABLE					-1000 to 1000 FT
RANGE DISPLAYED					200 FT
DIRECTION OF INCREASE					down
FIXED SCALE?					no
SCALE VALUES MARKED?					yes
STYLIC GRADUATIONS					20 FT
MOVING REFERENCE?					yes
TYPE OF REFERENCE					can't
HIDES IN WHICH FUNCTION IS AVAILABLE	A/A missile	weapons b	all arc. bore sight	S/T/A: weapons delivery; landing	bore sight weapons; guided weapons
DISPLAY CHANGES WITH HIDE CHANCES	none	none	none	none	none
NOTES	centered on OCTP cue	flashes 4 times/sec	flashes		

NUMBER	FUNCTION	76		76 (cont)		77		78		79	
		DISPLAY CLOSURE RATE	DISPLAY CLOSURE RATE	DISPLAY CLOSURE RATE	DISPLAY CLOSURE RATE	DISPLAY CLOSURE RATE	DISPLAY CLOSURE RATE	DISPLAY CLOSURE RATE	DISPLAY CLOSURE RATE	DISPLAY CLOSURE RATE	DISPLAY CLOSURE RATE
AIRCRAFT	F-14	F-14	F-14	F-15	F-15	MIL-D-81641(AS)	MIL-STD-884B				
FIGURE NO.	30	55	55	55	55	17	17				
FORM OF DISPLAY	vertical scale	digital (signed)	digital	vertical scale	vertical scale						
LOCATION ON HUC	left edge	left side (note)	right side (note)	right edge	right edge						
DISPLAY LABEL	none	none	none	C	C						
RANGE OF VARIABLE	-200 to 1000 KT			-1000 to 1000 KT							
RANGE DISPLAYED	1200 KT			200 KT							
DIRECTION OF INCREASE	up			down							
FIXED SCALE?	yes			no							
SCALE VALUES MARKED?	yes			yes							
SCALE GRADUATIONS	200 KT			20 KT							
HITTING REFERENCE?	yes			no							
TYPE OF REFERENCE	caret			horizontal line							
HOLDS IN WHICH FUNCTION IS AVAILABLE	A/A Sidewinder normal; A/A Sidewinder boresight; A/A optical track; A/A Phoenix normal; A/A Sparrow normal			A/A							
DISPLAY CHANGES WITH MODE CHANGES	none			display shifts with gear extension							
NOTES				numerals appear to left of caret indicating target range on range scale ref. 4							

NUMBER FUNCTION	80	81	81 (cont)	81 (cont)	81 (cont)	82
	COMMAND COURSE	COMMAND COURSE	COMMAND COURSE	COMMAND COURSE	COMMAND COURSE	COMMAND COURSE
AIRCRAFT	A-7	F-14	F-14	F-14	F-14	F-14
FIGURE NO.	9	31	9	9	32	
FORM OF DISPLAY	symbolic	symbolic	symbolic	symbolic	symbolic	
LOCATION ON HUD	none	none	none	none	none	
DISPLAY LINEAR	none	none	none	none	none	
RANGE OF VARIABLE	0 to 1000	0 to 1000	0 to 1000	0 to 1000	0 to 1000	
RANGE DISPLAYED	2°	2°	2°	2°	2°	
DIRECTION OF INCREASE	up	up	up	up	up	
FIXED SCALE?	no	no	no	no	no	
SCALE VALUES MARKED?	no	no	no	no	no	
SCALIN GRADUATIONS	no	no	no	no	no	
NOTING REFERENCE?	no	no	no	no	no	
TYPE OF REFERENCE	TF; en route NAVI-	cruise/TACAN; A/A	landing/AFN; A/G	landing/AFN; all	ADI	
SECS IN WAKE	none	Spurious norm.; A/A Phoenix normal	PCD	cruise exc. manual		
FUNCTION IS	stection					
AVAILABLE	no	no	no	no	no	
DISPLAY CHANGES	no vertical com-	none	none	none	none	
WITH HIDE CHANGES	mands in navigation mode					
NOTES	FD indicates steering error with respect to FPN (velocity vector)	align vertex of tee with A/C reticle	center crossed pointer	fly velocity vector to FD	NAV indicates IRS steering. TCM indicates TACAN. back angle steering provided by vertical bar of FD. ILS indicates glide slope command is given by PD. present if A/C within .6 of glide slope ref. 6	

NUMBER	83	84	85	86	87
FUNCTION	COMMAND COURSE	INDICATE DESTINA-	DISPLAY ENGINE	DISPLAY FLAP STATES	
AIRPORT:	P-111A	MIL-D-81641(AS)	TDS	TOQUE	
FIGURE NO.	15	8	P-15	CL-34	F-14
FORM OF DISPLAY	symbolic	symbolic	digital	digital	none
LOCATION ON IIRD			bottom of R scales	lower right	lower right
DISPLAY LABEL	none	none	none	none	none
RANGE OF VARIABLE					
RANGE DISPLAYED	more				
DIRECTION OF INCREASE					
FIXED SCALE?					
SCALE VALUES MARKED?					
SCALE GRADUATIONS					
MOVING REFERENCE?					
TYPE OF REFERENCE	command	takoff/navigation	ADI	approach	
HOURS IN WHICH					
FUNCTION IS					
AVAILABLE					
DISPLAY CHANGES	none	none	display shifts	none	none
WITH MODE CHANGES			with gear exten-		
NOTES	TDS: ADI: left deviation indicator shows slide scope deviation. full scale = .7° fly bars to piper	when FD centered in aperture of velocity vector, steering command is satisfied = .7°	number in window indicates INS destination selected		line appears over wing sweep indicator when flaps extended ref. 4

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FUNCTION	88	88 (cont)	69	90	91
DISPLAY FLIGHT PATH ANGLE	DISPLAY FLIGHT PATH ANGLE	DISPLAY FLIGHT PATH ANGLE	DISPLAY FLIGHT PATH ANGLE	DISPLAY FLIGHT PATH ANGLE	DISPLAY FLIGHT PATH ANGLE
AIRCRAFT	A-7	A-7	F-14	F-15	KY-SA
FIGURE NO.	26	33	26	26	27
FORM OF DISPLAY	ladder/symbolic	symbolic	ladder/symbolic	ladder/symbolic	ladder/symbolic
LOCATION ON TCU					
DISPLAY LABEL	none	none	none	none	none
NAME OF VARIABLE					
RANGE DISPLAYED	10°		20°	360°	360°
DIRECTION OF INCREASE	up		up	up	up
FIXED SCALE?	no		no	no	no
SCALE VALUES MARKED?	yes		yes	yes (note)	yes
SCALE CHARTINGS	5°		5°	note	30°
HOVING REFERENCE?	yes		yes	yes	yes
TYPE OF DIFFERENCE	flight path marker		velocity vector	velocity vector	A/C symbol
HIDES IN WHICH	all exc. landing		all	all	CEN; navigation
FUNCTION IS AVAILABLE					
DISPLAY CHANCES WITH MODE CHANCES	none	none	none	none	none
NOTES					scale divisions at 5°, numbered up to 30°, above 30° line spacing compressed, when 90° pitch exceeded, numbers decrease toward zero. zenith, nadir as in figure 25. display as in figure 25, exc. signs missing

NUMBER	92	92 (cont)	93	94	95
FUNCTION	DISPLAY GLIDE SLOPE	DISPLAY GLIDE SLOPE	DISPLAY GLIDE SLOPE	DISPLAY GLIDE SLOPE	DISPLAY CROSSING SPEED
ERROR	ERROR	ERROR	ERROR	none	CL-34
AIRCRAFT	F-14	F-14	F-14A	GL-84	
FIGURE NO.	31	8	13	1	
FORM OF DISPLAY	symbolic	symbolic	vertical scale	symbolic	DIGITAL
LOCATION ON HUD			left edge	lower center	upper Y quadrant
DISPLAY LABEL	none	none	none	none	none
RANGE OF VARIABLE					
RANGE DISPLAYED	-2°		-1.7°	up?	
DIRECTION OF INCREASE					
FIXED SCALE?		yes	no		
SCALE VALUES MARKED?			.175°		
SCALE CALIBRATIONS			yes		
MOVING REFERENCE?			horizontal line		
TYPE OF REFERENCE			commeted	approach	approach; transition
FIGURES IN WHICH FUNCTION IS AVAILABLE	Landing/ATL	lading/ATL			
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none	
NOTES	center crossed pointers	target designator.	for LS and ATL	deviation from glide slope is represented by deviation of speed diamond from approach aim point ref. 4	speed diamond used in transition to indicate ground speed with respect to runway C/L (see no. 11)

NUMBER	96	97	98	99	99 (cont)
FUNCTION	DISPLAY GROUND SPEED	GUN AIMING SYMBOL	GUN AIMING SYMBOL	GUN AIMING SYMBOL	GUN AIMING SYMBOL
AIR TO AIR	AV-SA	A-7	F-5	F-14	F-14
FIGURE NO.	34	35	4	10	16
TYPE OF DISPLAY	horizontal scale	symbolic	symbolic	symbolic	symbolic
LOCATION ON HUD	upper edge, left				
DISTANCE LABEL	none	none	none	none	none
RANGE OR VARIABLE	130 KT				
RANGE DISPLAYED	60 KT				
DIRECTION OF INCREASE	right				
FIXED SCALE?	yes				
SCALE VALUES MARKED?	no				
SIMILAR GRADUATIONS	15 KT				
PAGING REFERENCE?	yes				
TYPE OF REFERENCE	vertical line				
INDEX IN WHICH FUNCTION IS AVAILABLE	V/STOL	gun; rocket	guns	A/A manual gun; A/A optical track A/C COMP-TUOR (guns, rockets)	A/A manual gun; A/A optical track A/C COMP-TUOR (guns, rockets)
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none	none
NOTES	prior to APC 105. pointer removed if ground speed > 130 KT			movable reticle ref. 4	

NUMBER	99 (cont)			100			101			102			103		
	FUNCTION	GUN ARMING SYMBOL	GUN ARMING SYMBOL	GYRO ARMING SYMBOL	COMMAND HEADING	COMMAND HEADING	COMMAND HEADING	COMMAND HEADING	COMMAND HEADING	COMMAND HEADING	COMMAND HEADING	COMMAND HEADING	COMMAND HEADING	COMMAND HEADING	
ATTACK/F2	F-16	F-15	AV-8A	P-15	CL-8A	1									
FIGURE NO.	10	11	37	38											
FORM OF DISPLAY	symbolic	symbolic	symbolic	horizontal scale	symbolic										
LOCATION ON HUD				top edge	upper, lower edges										
DISPLAY LABEL	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
RANGE OF VARIABLE					360°										
RANGE DISPLAYED						30°									
DIRECTION OF INCREASE				L to R											
FIXED SCALE?				no	yes										
SCALE VALUES MARKED?				yes	no										
SCALE GRADUATIONS					2°										
ARMING REFERENCE?				yes		yes									
TYPE OF REFERENCE				vertical line	vertical line	vertical line	vertical line	vertical line	vertical line	vertical line	vertical line	vertical line	vertical line	vertical line	vertical line
FUNCTION IN WHICH FUNCTION IS AVAILABLE	A/A optical track	A/A gun	all exc. V/STOL	all											
DISPLAY UNITS	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
NOTES	(fixed reticle)			after ANC 105											
	ref. 4														
	ANC-14														
	indicate range														
	bearing														

NUMBER	FUNCTION	COMMAND HEADING	DISPLAY HEADING	107(cent)	
				105	106
AIRCRAFT	NIL-3-SIGAL(AS)	XII-STD-8843	A-7	F-14	F-14
FIGURE NO.	38	38	39	40	41
FORM OF DISPLAY	horizontal scale	horizontal scale	horizontal scale	horizontal scale	horizontal scale
POSITION ON RUD	top edge	top edge	top edge	top edge	top edge
DISPLAY LABEL	none	none	none	none	none
NAME OF VARIABLE	360°	360°	360°	360°	360°
RATE DISPLAYED	50°	40°	20°	30°	30°
DIRECTION OF INCREASE	L to R	L to R	L to R	L to R	L to R
FIXED SCALE?	no	no	no	no	no
SCALE VALUES MARKED?	yes	yes	yes	yes	yes
SCALE GRADUATIONS	5°	5°	5°	5°	5°
MOVING REFERENCE?	yes	yes	no	no	no
TYPE OF REFERENCE	caret	vertical line	caret	all exc. A/A	all exc. boresight
MOVES IN WHICH FUNCTION IS AVAILABLE	all exc. boresight	all		missile	
DISPLAY CHARACTERS WITH RUD CHANGES	none	none	none	boresight to bottom of RUD in landing/takeoff	ref. 4
NOTES					

FUNCTION	108	109	110	111	112
DISPLAY HEADING	DISPLAY HEADING	DISPLAY HEADING	DISPLAY HEADING	DISPLAY HEADING	DISPLAY HEADING
AIRCRAFT?	F-15	CL-84	AV-8A	MIL-D-81641(AS)	MIL-STD-884B
FIGURE NO.	38	1	39	38	38
FORM OF DISPLAY	horizontal scale	horizontal scale	horizontal scale	horizontal scale	horizontal scale
LOCATION ON HUD	top edge	top edge	below center	top edge	top edge
DISPLAY LABEL	none	none	none	none	none
RANGE OF VARIABLE	360°	360°	360°	360°	360°
RANGE DISPLAYED	30°		20°	50°	40°
DIRECTION OF INCREASE	L to R		L to R	L to R	L to R
FIXED SCALE?	no	yes	no	no	yes
SCALE VALUES MARKED?	yes	no	yes	yes	yes
SCALE GRAMMATIONS	Z'	none	5°	5°	5°
MOVING REFERENCE?	no	no	no	no	no
TYPE OF REFERENCE	caret	vertical line	vertical line	vertical line	vertical line
NODES IN WHICH FUNCTION IS AVAILABLE	all	approach; transition	V/STOL; GEN (before AFC 105); navigation	all exc. boxesight	all
DISPLAY CHANGES WITH MOVE CHANCES	none	none	none	none	none
NOTES		a digital display also appears in center			

NUMBER	113	114	115	115 (cont)	116
FUNCTION	DISPLAY IMPACT POINT	DISPLAY IMPACT POINT	DISPLAY IMPACT POINT	DISPLAY IMPACT POINT	COMMAND MACH NUMBER
AIRCRAFT	F-14	AV-8A	HIL-D-81(41)(AS)	HIL-D-81(41)(AS)	F-14
FIGURE NO.	10	42	10	15	3
FORM OF DISPLAY	symbolic	symbolic	symbolic	symbolic	digital
LOCATION ON HUD					top of left scale
DISPLAY LABEL	none	none	none	none	note
RANGE OF VARIABLE					
RANGE DISPLAYED					
DIRECTION OF INCREASE					
FIXED SCALE?					
SCALE VALUES MARKED?					
SCALE GRADUATIONS					
MOVING REFERENCE?					
TYPE OF REFERENCE	A/C exc. FOD	WING	WING	bore sight; bore sight	SIR ARE: Target
HODES IN WHICH				weapons	
FUNCTION IS					
AVAILABLE					
DISPLAY CHARGES	none			none	note
WITH MODE CHANGES					
NOTES	(moveable reticle)	appears as a solid line when more than 15° below PFL	(moveable reticle)		number is "trackstate" is command value ref. 4

NUMBER	117	117	118	119	120	121
FUNCTION	COMMAND MACH NUMBER	CMD MACH NUMBER	DISPLAY MACH NUMBER	DISPLAY MACH NUMBER	DISPLAY MACH NUMBER	DISPLAY MACH NUMBER
AIRCRAFT?	AV-8A	MIL-D-81641(AS)	F-14	F-15	AV-8A	
FUNCTION NO.	6	5	3			
FORM OF DISPLAY	horizontal scale	vertical scale	digital	digital		
LOCATION ON HUD	upper edge, left	left edge	top of left scale	below left scale	upper left	
DISPLAY LABEL	none	none	none	none	none	
RANGE OF VARIABLE	.1 M	0 to 4 M			.30 to 1.40 M	
RANGE DISPLAYED	.05 M	1 M			.30 to 1.40 M	
DIRECTION OF INCREASE	right	down				
FIXED SCALE?	yes	no				
SCALE VALUES MARKED?	no	yes				
SCALE GRADUATIONS	.05 M	.1 M	.01 M			
MOVING REFERENCE?	yes	yes				
TYPE OF REFERENCE	vertical line	caret				
HOLES IN WHICH FUNCTION IS AVAILABLE	all exc. V/StOL and A/A	all exc. boraflight	all exc. landing	A/A	V/StOL (before APC 103) NAY (after APC 103)	
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none		
NOTES				ref. 4	ref. 6	

NUMBER	122	123	INDICATE MASTER ARM STATUS	INDICATE MASTER ARM STATUS	124	125	126
FUNCTION	DISPLAY MACH INDIC	DISPLAY MACH INDIC					DISPLAY MISSILE TARGET
AIRCRAFT	MIL-D-81541(AS)	P-14	P-15	MIL-D-81641(AS)	MIL-D-81641(AS)		
FIGURE NO.	5		22				35
FORM OF DISPLAY	vertical scale	symbolic		symbolic			symbolic
LOCATION ON WWD	left edge						
DISPLAY LABEL	N	none	none	none	none	none	
RANGE OF VARIABLE	0 to 4 M						
RANGE DISPLAYED	1 M						
DIRECTION OF INCREASE	down						
FIXED SCALE?	no						
SCALE VALUES MARKED?	yes						
SCALE GRADUATIONS	-1 M						
MOVING REFERENCE?	no						
TYPE OF REFERENCE	horizontal line						
PODES IN WHICH FUNCTION IS AVAILABLE	all exc. boresight cruise; A/A; A/C	all		IR; boresight weap- ons; gridded weap- ons; boresight			gridded weapons
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none	none	none	
NOTES	X through statement selection display (see no. 52)		see no. 43	X through statement selection display (see no. 53)			

FUNCTION	NUMBER	127		128		129		130		131	
		INDICATE MISSILE TARGET STATUS	DISPLAY NAVIGATION ADVISORIES	PRIVATE NAVIGATION MODE SELECTED	DISPLAY NAVIGATION ADVISORIES	DISPLAY PITCH MODE	DISPLAY RANGE TO DESTINATION	DISPLAY PITCH MODE	DISPLAY RANGE TO DESTINATION	DISPLAY PITCH MODE	DISPLAY RANGE TO DESTINATION
AIRCRAFT	MIL-D-8161(AS)	P-15	P-15	P-11A	P-15	15	vertical scale	vertical scale	vertical scale	vertical scale	vertical scale
FIGURE NO.	43	letters	letters	bottom L and R	bottom L and R	left edge	left edge	left edge	left edge	left edge	left edge
FORM OF DISPLAY	symbolic	bottom L and R	bottom L and R	bottom L and R	bottom L and R	none	none	none	none	none	none
LOCATION ON HUD	note	note	note	note	note	none	none	none	none	none	none
DISPLAY LABEL						yes	±10°	±10°	±10°	±10°	±10°
RANGE OF VARIABLE						yes	2.5	2.5	2.5	2.5	2.5
RANGE DISPLAYED						no	horizontal line	horizontal line	horizontal line	horizontal line	horizontal line
DIRECTION OF INCREASE						all exec. command	ADI	ADI	ADI	ADI	ADI
FIXED SCALE?											
SCALE VALUES MARKED?											
SCALE GRADUATIONS											
MOVING REFERENCE?											
TYPE OF REFERENCE											
HOLES IN UHCR		guided weapons	ADI								
FUNCTION IS AVAILABLE											
DISPLAY CHANCES WITH HOE CHANCES		note	display shifts with gear extension	display shifts with gear extension	display shifts with gear extension	some	some	some	some	some	some
NOTES		in system with multi-shot capability, tail appears when target is range, numeric indicates missile number assigned to target	"SET COURSE" "LOAD ALTITUDE" "LOWER MARKER" "MIDDLE MARKER" ref. 6	"MAP" "ILS-N" "ILS-T" "TCR"							

NUMBER	132	133	134	135	136
FUNCTION	DISPLAY RANGE-TO- GO TO IN-RANGE	DISPLAY RANGE-TO- GO TO PULLUP POINT	DISPLAY RANGE-TO- GO TO PULLUP POINT	DISPLAY RANGE-TO- GO TO PULLUP POINT	DISTANT RANGE-TO- GO TO PULLUP POINT
AIRCRAFT	P-16	A-7	P-14	P-15	MIL-P-31057(D)
FIGURE NO.	13	13	13	43	43
FORM OF DISPLAY	symbolic	symbolic	symbolic	symbolic	symbolic
LOCATION ON HUD					
DISPLAY LEVEL	none	none	none	none	none
NAME OF VARIABLE					
RANGE DISPLAYED					
DIRECTION OF INCREASE					
FIXED SCALE?					
SCALE VALUES MARKED?					
SCALE GRADUATIONS					
MOVING REFERENCE?					
TYPE OF REFERENCE					
HOLSES IN WHICH	A/C computer IP;	attack exec. gun,	A/C computer	A/C	
FUNCTION IS	A/G computer TGT	rocket			
AVAILABLE					
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none	none
NOTES					distance of pullup cue below velocity vector represents range-to-go. upper solution cue line is actually longer than lower line. (as in figure 45)

ITEM/NUMBER	137	138	139	140	141
FUNCTION	DISPLAY RANGE-TV- GO TO PULLUP POINT	DISPLAY RANGE-TV- GO TO WEAPON RELEASE	DISPLAY RANGE-TV- GO TO NEW RELEASE	DISPLAY RANGE-TV- GO TO NEW RELEASE	DISPLAY RANGE-TV- GO TO NEW RELEASE
AIR AFF?	MIL-STD-884A	A-7	P-14	P-15	MIL-STD-884(A)
FIGURE NO.	45	13	13	45	45
FORK OF DISPLAY	symbolic	symbolic	symbolic	symbolic	symbolic
LOCATION ON IUD	none	none	none	none	none
DISPLAY LABEL	none	none	none	none	none
RANGE OF VARIABLE					
RANGE DISPLAYED					
DIRECTION OF INCREASE					
FIXED SCALE?					
SCALE VALUES MARKED?					
SCALE GRADUATIONS					
MOVING REFERENCE?					
TYPE OF REFERENCE					
HOLE IN WHICH FUNCTION IS AVAILABLE	weapon delivery	attack exec. gun, rocket	A/C computer II; A/C computer TEC	A/C	none
DISPLAY CHANGES WITH MOVE CHANGES	none	none	none	none	none
NOTES					

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NUMBER	142	143	144	145	146
FUNCTION	DISPLAY IMAGE-TO- GO TO UP RELEASE	COMMAND ROTATION ANGLE	DISPLAY DISPLAY IMAGE	DISPLAY DISPLAY IMAGE	DISPLAY DISPLAY IMAGE
AIRCRAFT	MIL-STD-884B	MIL-D-81641(AS)	CL-84	MIL-D-81641(AS)	MIL-STD-884B
FIGURE NO.	65	23	1	46	47
FORM OF DISPLAY	symbolic	symbolic	symbolic	symbolic	symbolic
LOCATION ON HUD	-	-	none	none	none
DISPLAY LABEL	none	none	none	none	none
RANGE OF VARIABLE					
RANGE DISPLAYED					
DIRECTION OF INCREASE					
FIXED SCALE?					
SCALE VALUES MARKED?					
SCALE GRADUATIONS					
BAKING REFERENCE?					
TYPE OF REFERENCE					
HOLDS IN WHICH FUNCTION IS AVAILABLE	weapon delivery	takeoff/navigation	approach; transi- tion	landing	landing
DISPLAY CHANGES WITH HOLD CHANGES	none	none	none	none	none
NOTES					

NUMBER	FUNCTION	147		147 (cont)		DISPLAY SENSOR SCAN									
		AIR LAW	F-14	F-14	8	F-15	12	F-14	43	F-14	43	F-14	43	F-14	43
	PILOTAGE NO.		48												
	FORM OF DISPLAY		symbolic		symbolic		symbolic		symbolic		symbolic		symbolic		symbolic
	INDICATION OR IND.														
	DISPLAY LABEL		none		none		none		none		none		none		none
	RANGE OF VARIABLE														
	RANGE DISPLAYED														
	DIRECTION OF INCREASE														
	FIXED SCALE?														
	SCALE VALUES MARKED?														
	SCALE GRADUATIONS														
	HOW MUCH DIFFERENCE?														
	TYPE OF INFORMATION														
	INDICES IN HI-PIKE														
	FUNCTIONS AVAILABLE														
	DISPLAY CHANGES WITH HI-PIKE CHANGES														
	NOTES														
	Indicates Side-winder search and lock-on, circle disappears and dot flashes														
	ref. 4														
	winner search and lock-on, circle disappears and dot flashes														
	ref. 4														

FUNCTION	NUMBER	151	152	DISPLAY TAS ERROR	DISPLAY LAS ERROR	STATION RETICLE	STATION RETICLE
		153	154	155			
AIRCRAFT	F-101A	AV-8A	A-7	F-14	MIL-D-31641(US)		
FIGURE NO.	15	6	51	52	53		
FORM OF DISPLAY	vertical scale	horizontal scale	symbolic	symbolic	symbolic		
LOCATION ON HUD	right edge	top edge, left			centered at ADL		
DISPLAY LABEL	none	none	none	none	none	none	
RANGE OF VARIABLE	±30 KT	±40 KT					
RANGE DISPLAYED	±30 KT	±20 KT					
DIRECTION OF INCREASE	L to R						
FIXED SCALE?	yes						
SCALE VALUES MARKED?	no						
SCALE GRADUATIONS	10 KT	20 KT					
SHOWING REFERENCE?	yes						
TYPE OF REFERENCE	horizontal line	vertical line					
TABLES IN WHICH	all						
FUNCTION IS AVAILABLE	V/STOL, AA						
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none	none	none	
NOTES	indications are unreliable in inter- trial mode			reticle can be manually depressed from 0 to 210 mils below sight line	circles: 5°, 10°, 15° dis- tance ref. A.		

NUMBER	156	157	158	159 (cont)	INDICATE TARGET	INDICATE TARGET	INDICATE TARGET
FUNCTION	DISPLAY TACAN	DISPLAY TACAN	DISPLAY TACAN	DISPLAY TACAN	IN-RANGE	IN-RANGE	IN-RANGE
AIR TRAFFIC	P-14	AV-8A	A-7	A-7	P-15	P-15	P-15
FIGURE NO.	24	35	13	13	36	Letters	Letters of Targets
FORM OF DISPLAY	vertical bar (note)	HOR scale/symbolic	symbolic	symbolic	none	none	none
LOCATION ON IUD	centered vertically below center	stop siding symbol	stop siding symbol	stop siding symbol	none	none	none
DISPLAY LABEL	none	none	none	none	none	none	none
RANGE OF VARIABLE	note	± 7°	± 7°	attack (guns, rockets)	attack (guns, rockets)	attack (guns, rockets)	attack (guns, rockets)
SCALE DISPLAYED	± 6°	L to R	L to R	ATM profile	ATM profile	ATM profile	ATM profile
DIRECTION OF INCREASE		no	no				
FIXED SCALE?	yes	yes	yes				
SCALE VALUES MARKED?	no	yes	yes				
SCALING GRADUATIONS	1°	1°	1°				
SWING REFERENCE?	yes	yes	yes				
TYPE OF REFERENCE	vertical line	horseshoe	all				
ARMED IN WHICH FUNCTION IS AVAILABLE	takeoff/TACAN; cruise/TACAN; landing/TACAN						
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none	none	none	none
NOTES	bar limits at edge of display nearest radial.	diagonal line through horseshoe indicates limiting	appears at 2100 ft	1600 ft. 1300	"H TACAN"	ref. 6	solution case approach when target is in range

NUMBER	FUNCTION	160		161		162		163		163(cont)	
		INDICATE TARGET IN-RANGE	OUT OF RANGE	DISPLAY TARGET RANGE	DISPLAY TARGET RANGE	DISPLAY TARGET RANGE	DISPLAY TARGET RANGE	DISPLAY TARGET RANGE	DISPLAY TARGET RANGE	DISPLAY TARGET RANGE	DISPLAY TARGET RANGE
AIRCRAFT	MIL-D-31641(AS)	F-14	F-5	F-14	F-14	F-14	F-14	F-14	F-14	F-14	F-14
FIGURE NO.	43	8	symbolic	symbolic	vertical scale	vertical scale	vertical scale	vertical scale	vertical scale	vertical scale	vertical scale
FORM OF DISPLAY	symbolic	symbolic	symbolic	symbolic	none	none	none	none	none	none	none
LOCATION ON HUD	-	-	-	-	-	-	-	-	-	-	-
DISPLAY LABEL	none	none	none	none	none	none	none	none	none	none	none
NAME OF VARIABLE	-	-	-	-	-	-	-	-	-	-	-
RANGE DISPLAYED	-	-	3000 FT*, 60000 FT†	note	note	note	note	note	note	note	note
DIRECTION OF INCREASE	-	-	clockwise	up	up	up	up	up	up	up	up
FIXED SCALE?	-	-	yes	yes	yes	yes	yes	yes	yes	yes	yes
SIMILAR VALUES MARKED?	-	-	no	yes	yes	yes	yes	yes	yes	yes	yes
SIGN & GRADUATIONS	-	-	-	1000 FT*, 10000 FT†	note	note	note	note	note	note	note
SWING REFERENCE?	-	-	-	yes	yes	yes	yes	yes	yes	yes	yes
TYPE OF REFERENCE	-	-	-	analog bar	note	note	note	note	note	note	note
HODES IN WHICH FUNCTION IS AVAILABLE	guided weapons	A/A manual gun; A/A Sidewinder	gun*; missile†	A/A optical track; A/A Sidewinder; Bore sight; A/A Sidewinder normal; A/A Sparrow normal; A/A Phoenix normal	-	-	-	-	-	-	-
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none	none	none	none	none	none	none	none
NOTES	see no. 127	symbol disappears when target in range	tail appears on symbol when in range	diamond shaped marker indicates in-range; round marker indicates minimum range	ref. 3 says scale is on left edge of HMD. Il- lustrations show scale on right edge.	range selectable: 5, 10, 20, 50, 100, 200 NM. Grada- tions depend on RSC	range selectable: 5, 10, 20, 50, 100, 200 NM. Grada- tions indicated by caret. MAX and MIN indicated by HOD lines	range selectable: 5, 10, 20, 50, 100, 200 NM. Grada- tions indicated by caret. MAX and MIN indicated by HOD lines	range selectable: 5, 10, 20, 50, 100, 200 NM. Grada- tions indicated by caret. MAX and MIN indicated by HOD lines	range selectable: 5, 10, 20, 50, 100, 200 NM. Grada- tions indicated by caret. MAX and MIN indicated by HOD lines	range selectable: 5, 10, 20, 50, 100, 200 NM. Grada- tions indicated by caret. MAX and MIN indicated by HOD lines

FUNCTION	163(cross)	164	165	DISPLAY TARGET NAME	DISPLAY TERRAIN NAME	166	167
RANGE							
AIRCRAFT	F-14	P-13		MIL-P-16161(TS)	MIL-P-16161(TS)		
FIGURE NO.	36	35	57				
FORM OF DISPLAY	symbolic	vertical scale	horizontal scale	symbolic	symbolic		
LOCATION ON HUD		right side	bottom edge				
DISPLAY LABEL	none	none	none	none	none		
RANGE OF VARIABLE	0 to 4000 FT	up	L to R				
RANGE DISPLAYED	0 to 4000 FT	note	note				
DIRECTION OF INCREASE	clockwise						
FIXED SCALE?	yes	yes	yes				
SCALE VALUES MARKED?	no	yes	yes				
SCALE GRADUATIONS	1000 FT	yes	yes				
HWING REFERENCE?							
TYPE OF REFERENCE	note	note	note				
HODES IN WHICH FUNCTION IS AVAILABLE	J/A optical track	A/A		storesight weapons ; guided weapons	terrain following W/T		
DISPLAY CHANGES WITH MODE CHANGES	none	display shifts with gear extension	range scale change	none			
NOTES		sides of a diamond disappear one at a time with decreas- ing range	range selectable. target range in- dicated by caret. 2 MAX and 1 MIN ranges indicated by horizontal lines.	symbolology appears at lockon. display range for bore sight shall be 11000 FT. incre- ments ~1000 FT. range for guided weapons in W/T, with 1 MIN increments. range indicated by vertical line. MAX and MIN ranges indi- cated by caret see no. 77	horizontal lines represent elevation angles to highest terrains within each of 5 range incre- ments		

NUMBER	168	169	170	171	172
FUNCTION	DISPLAY TIME-TO-GO TO WEAPON RELEASE	DISPLAY TIME-TO-GO TO WEAPON RELEASE	DISPLAY VELOCITY VECTOR	DISPLAY VELOCITY VECTOR	DISPLAY VELOCITY VECTOR
AIR DATA	F-14	F-111A	AV-8A	A-7	F-14
FIGHTER NO.	10	15	39	9	9
FORM OF DISPLAY	circular scale	circular scale	HOR scale, symbolic	symbolic	symbolic
LOCATION ON RUD			below center		
DISPLAY LABEL	none	none	none	none	none
MAPS OR VARIABLE	15 seconds				
RANGE DISPLAYED	15 seconds	note	15°		
DIRECTION OF INCREASE	clockwise	clockwise	L to R		
FIXED SCALE?	yes	yes	no		
SCALED VALUES MARKED?	no	no	yes		
POINT GRADUATIONS	5 seconds	note	.5°		
TYPE OF REFERENCE	yes	yes	yes		
TYPE OF REFERENT	bar	bar	horseshoe		
RAWS IN WHICH	A/G manual	command; DIV; LADD	all		
FUNCTION IS					
AVAILABLE					
DISPLAY CHANGES	none	none	none	none	none
WITH HIGH GAGES					
NOTES	ref. 4 ANG-14	time scale selecta- ble, full scale 300 seconds has 100 second graduation; 30 second scale has 10 second gradu- tions.	after AFG 105		

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NUMBER	FUNCTION	173	174	175	176	176	177
AIRCRAFT?	VECTOR	DISPLAY VELOCITY	DISPLAY VELOCITY	DISPLAY VELOCITY	COMMAND VERTICAL	COMMAND VERTICAL	
FIGURE NO.	F-15	VECTOR	VECTOR	VECTOR	SPEED	SPEED	
FORM OF DISPLAY	9	MIL-D-81641(AS)	MIL-STD-882A3	MIL-STD-882A3	MIL-D-81641(AS)	MIL-STD-882A3	
LOCATION ON HUD	symbolic	45	45	45	5	5	
DISPLAY LABELS		symbolic	symbolic	symbolic	vertical scale	vertical scale	
RANGE OF VARIABLE	none	none	none	none	left edge	vertical scale	
RANGE DISPLAYED						left edge	
DIRECTION OF INCREASE					V		
FIXED SCALE?					±10000 FT/MIN		
SCALE VALUES MARKED?					±1000 FT/MIN		
SCALE GRADUATIONS							
MOVING REFERENCE?							
TYPE OF REFERENCE							
NODES IN WHICH							
FUNCTION IS	all	all exc. boresight	all	100 FT/MIN	yes	yes	
AVAILABLE					caret	caret	
DISPLAY CHANGES	none	none	none	all exc. boresight			
WITH MODE CHANGES	none	none	none				
NOTES							

NUMBER	178	179	180	181
FUNCTION	DISPLAY VERTICAL SPEED	DISPLAY VERTICAL SPEED	DISPLAY VERTICAL SPEED	DISPLAY VERTICAL SPEED
AIRCRAFT	A-7	F-14	CL-34	AV-8A
FIGURE NO.	2	3C	16	19
FORM OF DISPLAY	vertical scale	vertical scale	vertical scale	vertical scale
LOCATION ON HUD	right edge	left edge	right edge	right edge
DISPLAY LABEL	none	none	none	none
RANGE OF VARIABLE	±1000 FT/MIN	±1500 FT/MIN	±10000 FT/MIN	2000 to -3000 FT/MIN
RANGE DISPLAYED	±1000 FT/MIN	±1500 FT/MIN	±10000 FT/MIN	1000 to -2000 FT/MIN
SIGNS FORM OF INCREASE	up	up	up	up
FIXED SCALE?	yes	yes	yes	yes
SCALE VALUES MARKED?	no	yes	no	no
SCALE GRADUATIONS	200 FT/MIN	500 FT/MIN	200 FT/MIN	500 FT/MIN
MOVING REFERENCE?	yes	yes	yes	yes
TYPE OF REFERENCE:	triangle	caret	V with sidebar	"theirs" with caret
MODES IN WHICH FUNCTION IS AVAILABLE	landing; Data Link	takeoff; landing	approach; transition	V/STOL; NAV; GIM
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none
NOTES			ref. 4	

NUMBER	FUNCTION	182		183		184		185		186	
		DISPLAY VERTICAL	SPEED	DISPLAY VERTICAL	SEARCH AREA	DISPLAY VISUAL	SEARCH AREA	DISPLAY VISUAL	SEARCH AREA	INDICATE PRESENCE OF WARNING SIGNAL	DISPLAY VISUAL
AIRCRAFT	HIL-D-31641(AS)	MIL-STD-884B		F-10	F-11A	A-7					
FUNCTION NO.	5		5	59	15	60					
TYPE OF DISPLAY	vertical scale	vertical scale	symbolic	symbolic	symbolic	symbolic	symbolic	symbolic	symbolic	symbolic	symbolic
LOCATION ON HUD	left edge	left edge	none	none	none	none	none	none	none	none	none
DISPLAY LABEL	V	V	V	V	V	V	V	V	V	V	V
RANGE OR VARIABLE	±10000 FT/MIN										
RANGE DISPLAYED	10000 FT/MIN										
DIRECTION OF INCREASE											
FIXED SCALE?	no		yes								
SCALE VALUES MARKED?	yes										
SCALE GRADUATIONS	100 FT/MIN										
HAVING REFERENCE?	no										
TYPE OF REFERENCE	horizontal line	horizontal line	horizontal line	horizontal line	horizontal line	horizontal line	horizontal line	horizontal line	horizontal line	horizontal line	horizontal line
MODES IN WHICH FUNCTION IS AVAILABLE	all exc. bore sight			takeoff; weapon delivery; landing	A/A						
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none	none	none	none	none	none	none	none
NOTES											

NUMBER	187	188	189	190	191
FUNCTION	INDICATE PRESENCE OF WARNING SIGNAL	INDICATE PRESENCE OF WARNING SIGNAL	INDICATE PRESENCE OF WARNING SIGNAL	INDICATE PRESENCE OF WARNING SIGNAL	INDICATE PRESENCE OF WARNING SIGNAL
AIRCRAFT	F-14	F-14	MIL-D-81641(AS)	MIL-D-81641(AS)	MIL-D-81641(AS)
FIGURE NO.	61	61	61	61	45
FORM OF DISPLAY	symbolic	Letters	symbolic	Sym/letters (note)	symbolic
LOCATION ON HUD	below center	note	below center	note	note
DISPLAY LABEL	none	note	note	note	none
NAME OF VARIABLE					
RANGE DISPLAYED					
DIRECTION OF INCREASE					
FIXED SCALE?					
SCALE VALUES MARKED?					
SCALE GRADUATIONS					
SWING REFERENCE?					
TYPE OF REFERENCE					
HODES IN WHICH FUNCTION IS AVAILABLE	all	all	all exc. boresight	all	bosding
DISPLAY CHANGES WITH MODE CHANGES	none	none	none	none	none
NOTES	flashes	word "warning" appears alternately above and below center of display	either large flash-flashes 4 times/sec	velocity vector symbol flashes for 3 seconds after flashing word "WAREM" in lower left corner	4 times/sec

FUNCTION	192	193	DISPLAY WING SHEEP
DISPLAY WING INCIDENCE			
AIR LAFT	GL-84	V-14	
FLIGHT NO.	1		
FORMAT OF DISPLAY	vertical scale	digital	
LOCATION ON HUD	right edge	lower right	
DISPLAY LABEL	nose	none	
RANGE OF VARIABLE		20° to 68°	
SCALE DISPLAYED		20° to 68°	
DIRECTION OF INCREASE			
PIPED SCALE?	yes		
SCALE VALUES MARKED?	no	1°	
STATIC GRADUATIONS			
HOLDING REFERENCE?	yes		
TYPE OF REFERENCE	rectangle		
THUMBS IN WHICH FUNCTION IS AVAILABLE	approach		
DISPLAY CHANCES	none	none	
WING HOSE CHANCES			see no. 87 ref. 4
ICLUE			

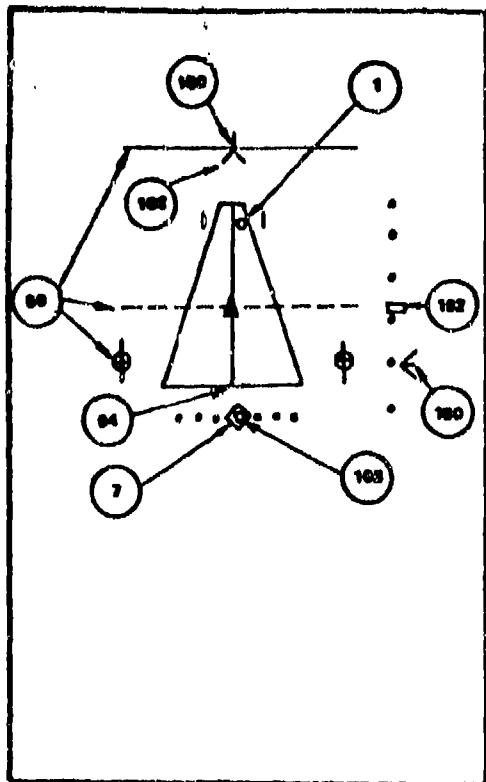


FIG. 1

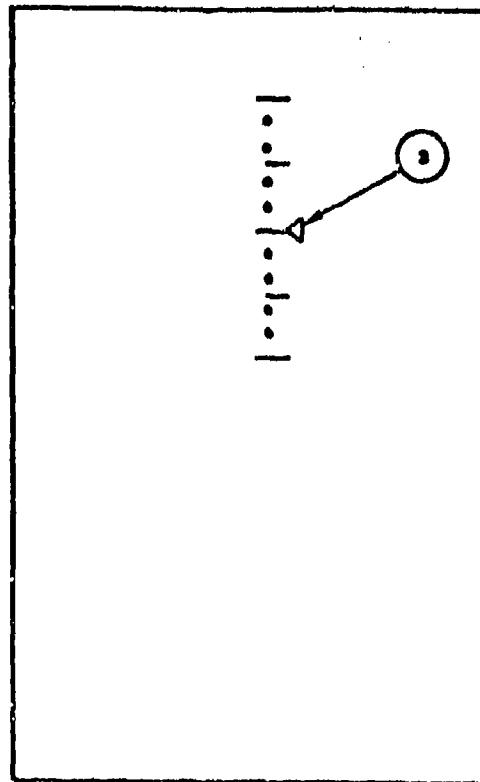


FIG. 2

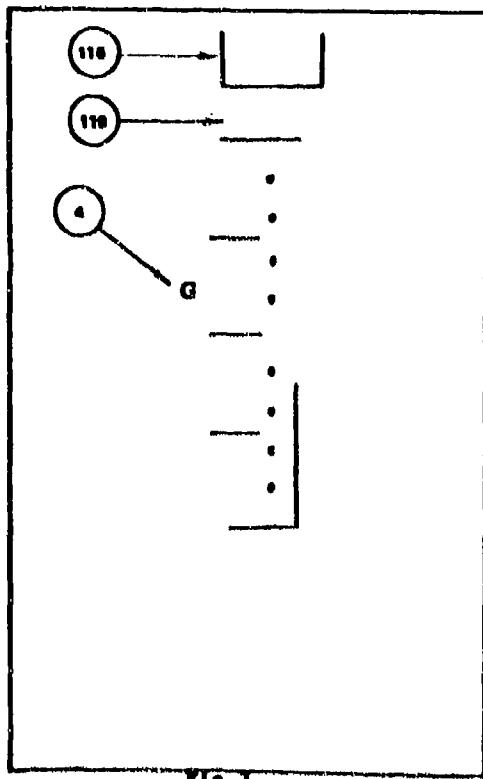


FIG. 3

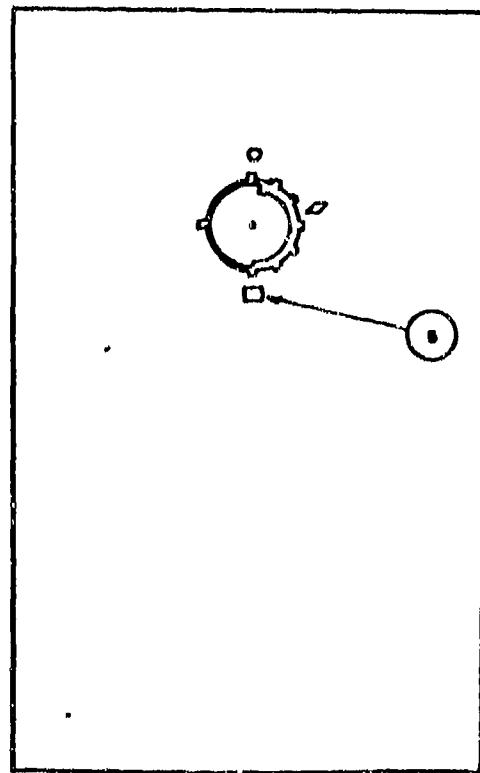


FIG. 4

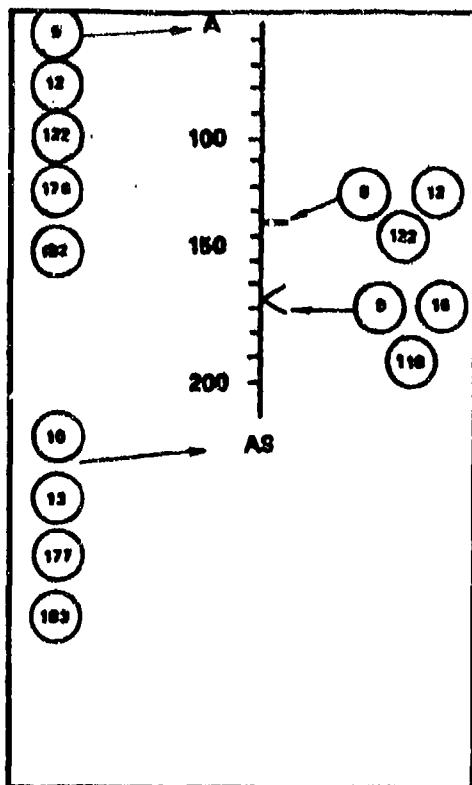


Fig. 5

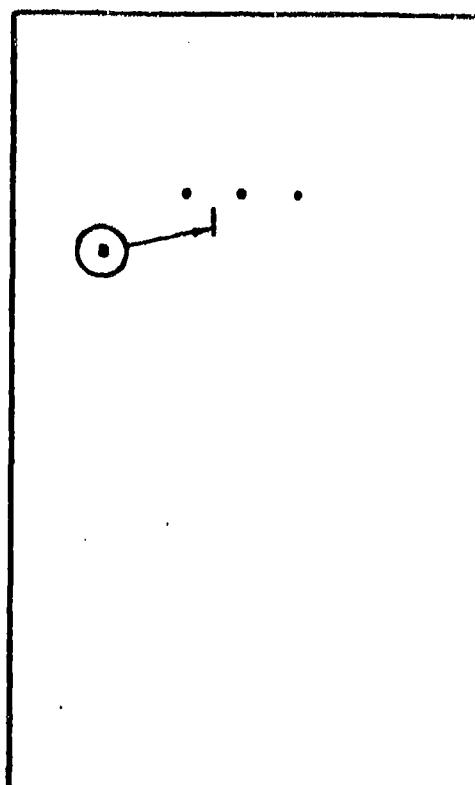


Fig. 6

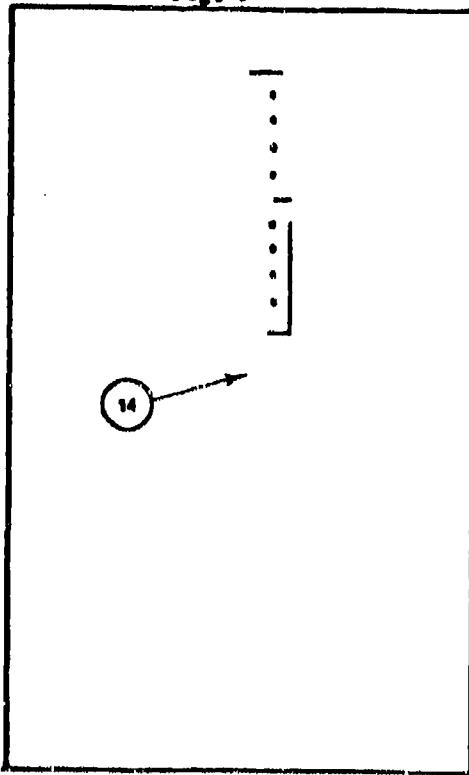


Fig. 7

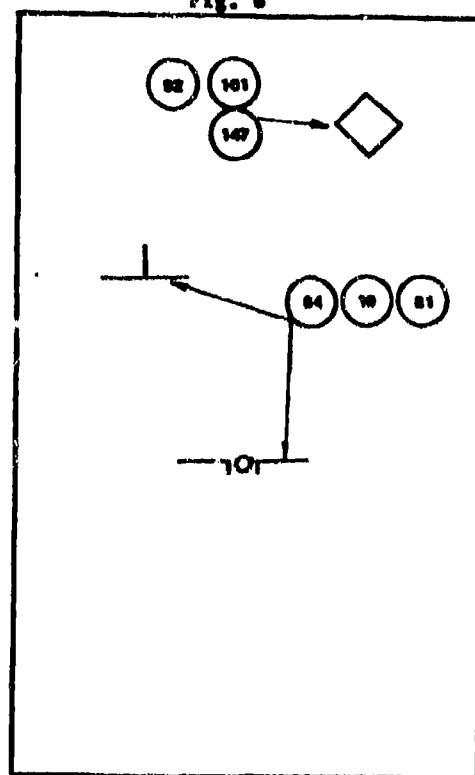


Fig. 8

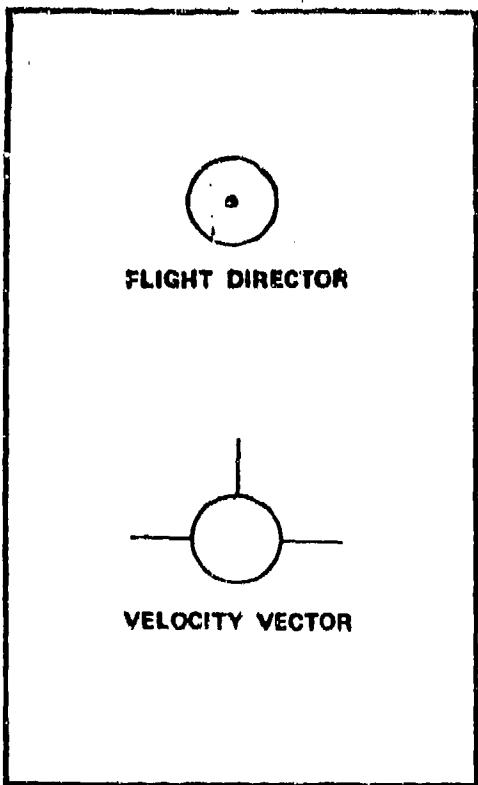


Fig. 9

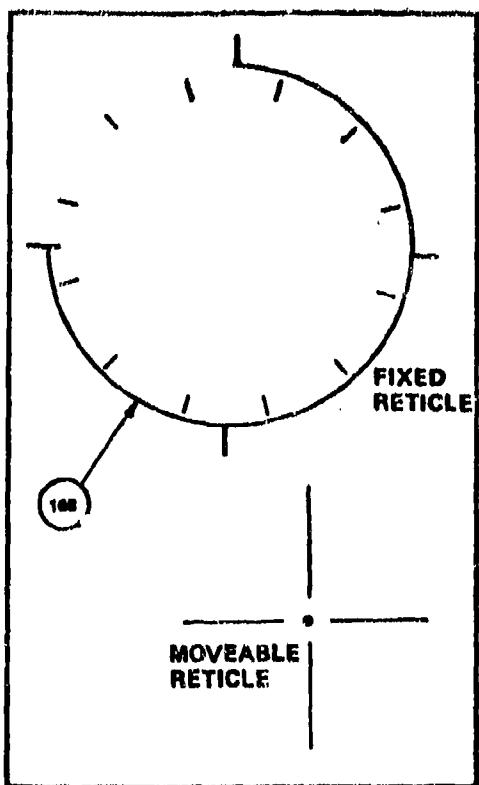


Fig. 10

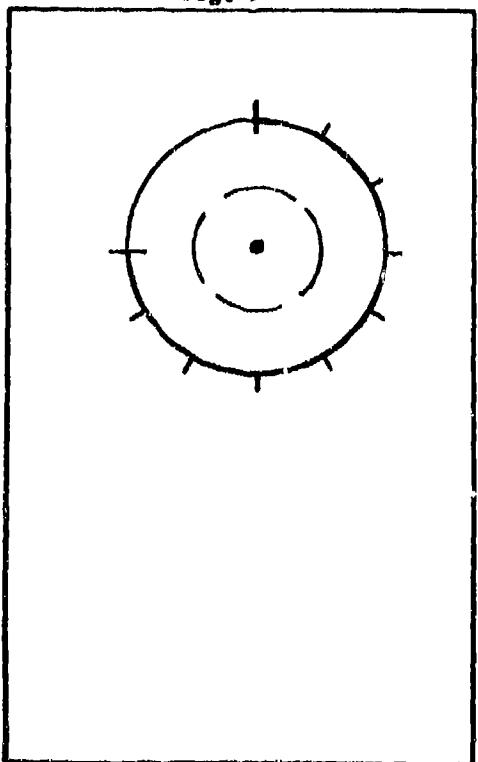


Fig. 11

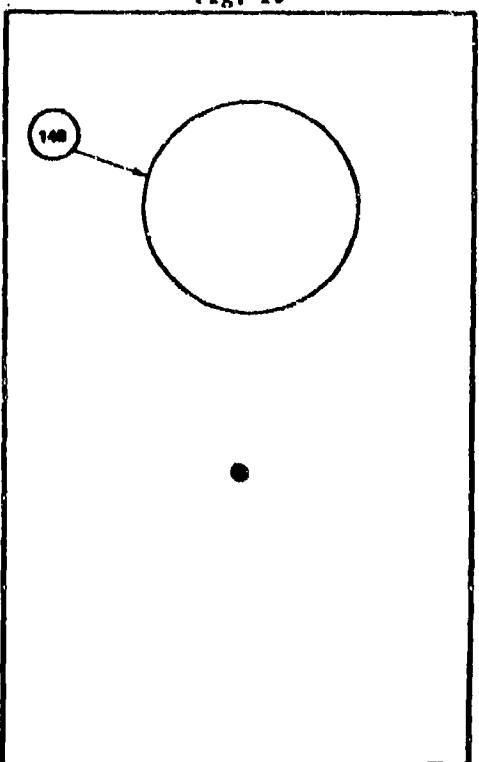


Fig. 12

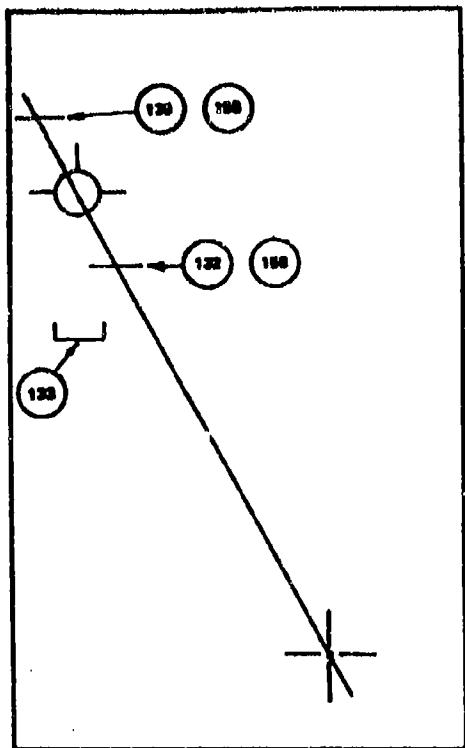


Fig. 13

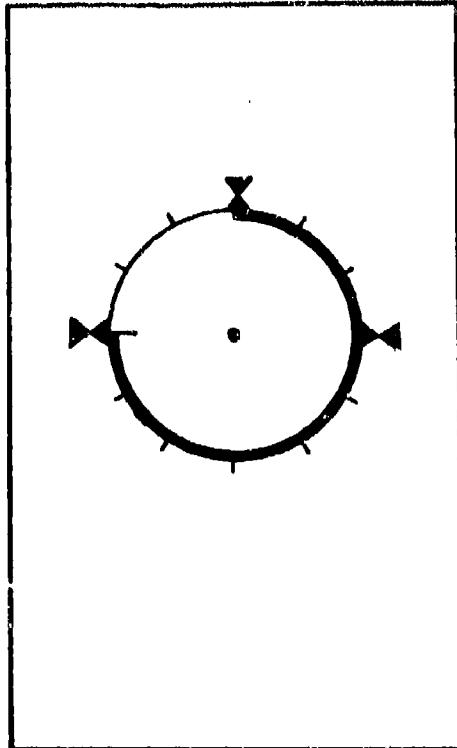


Fig. 14

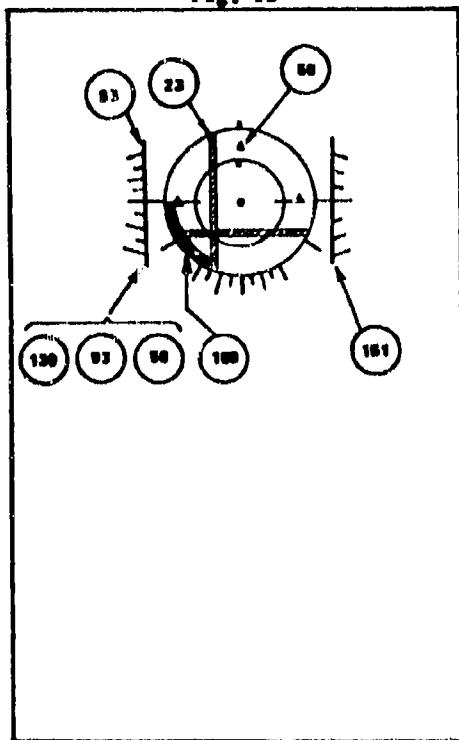


Fig. 15

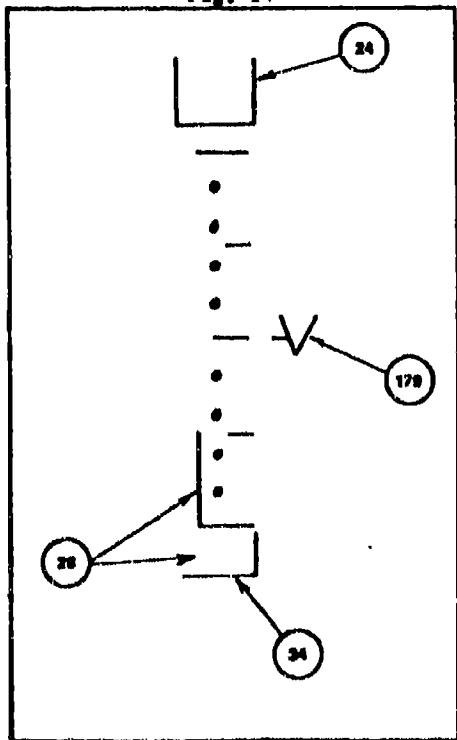


Fig. 16

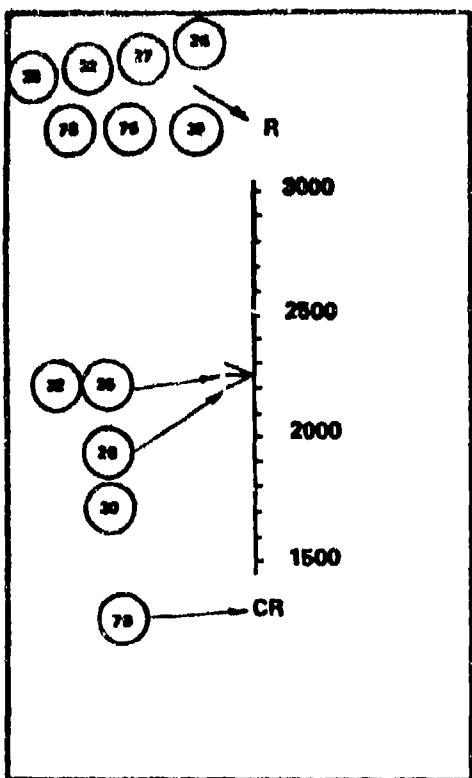


Fig. 17

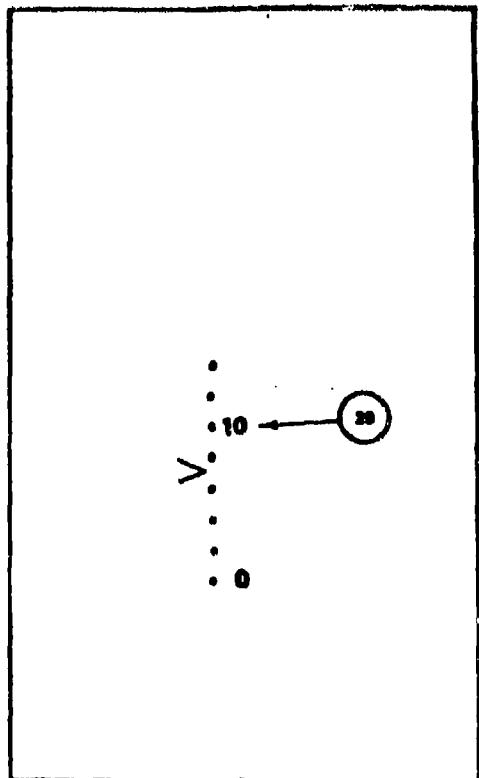


Fig. 18

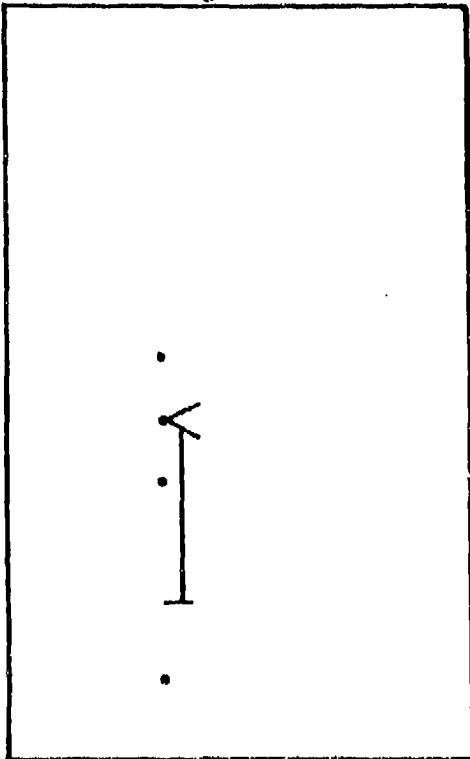


Fig. 19

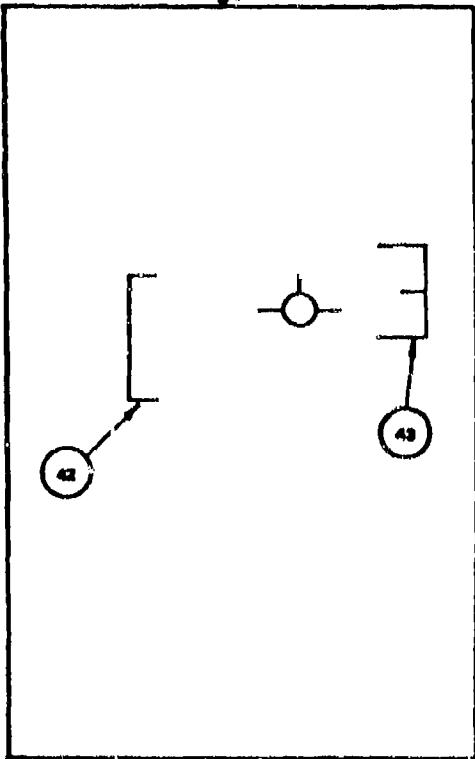


Fig. 20

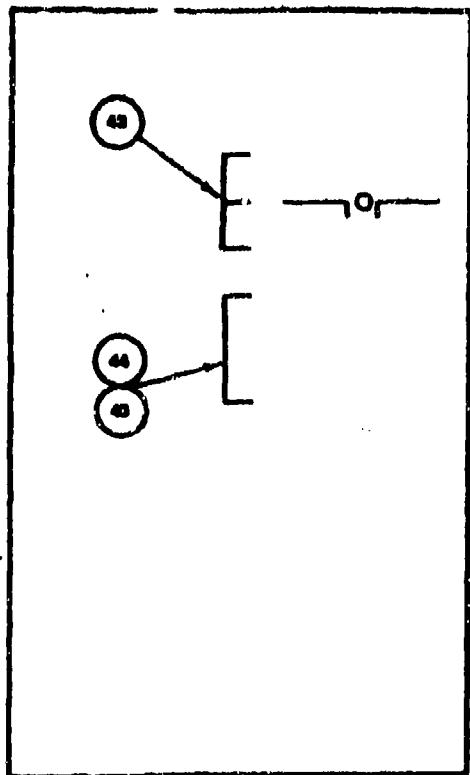


Fig. 21

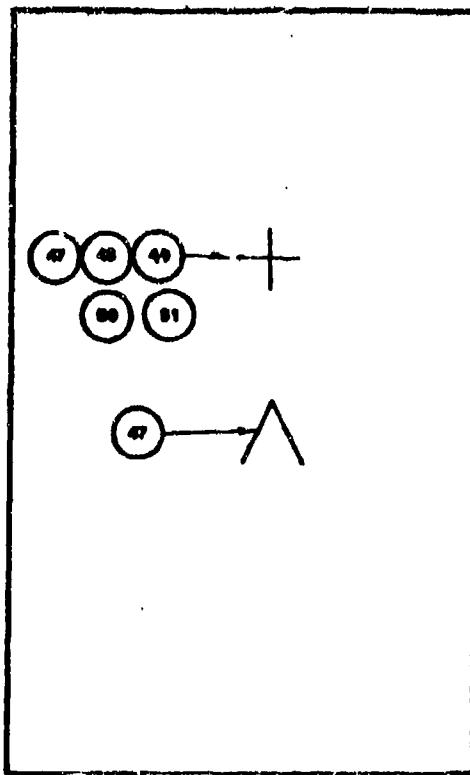


Fig. 22

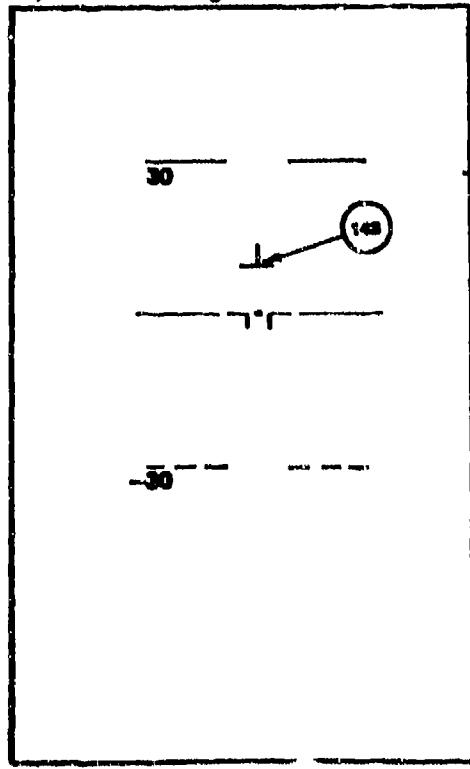


Fig. 23

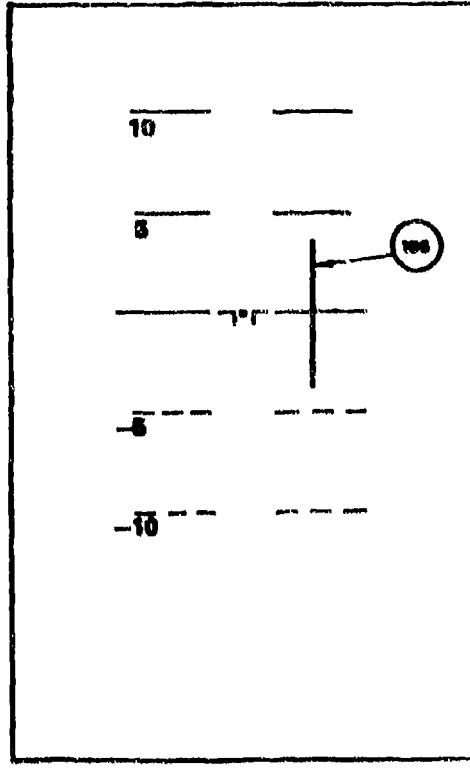


Fig. 24

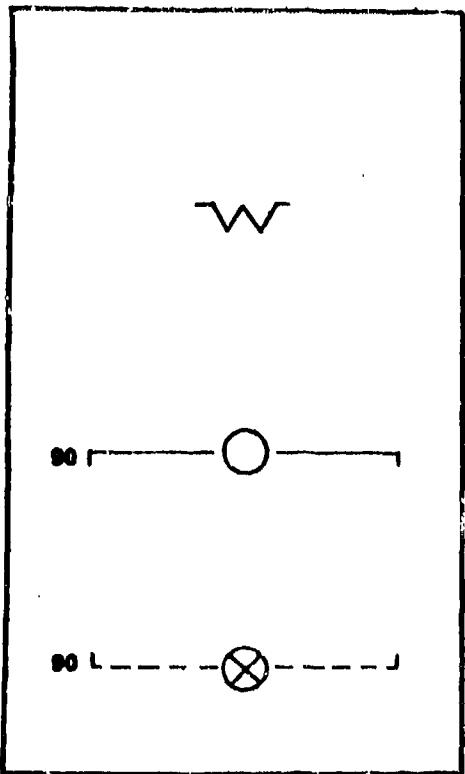


Fig. 25

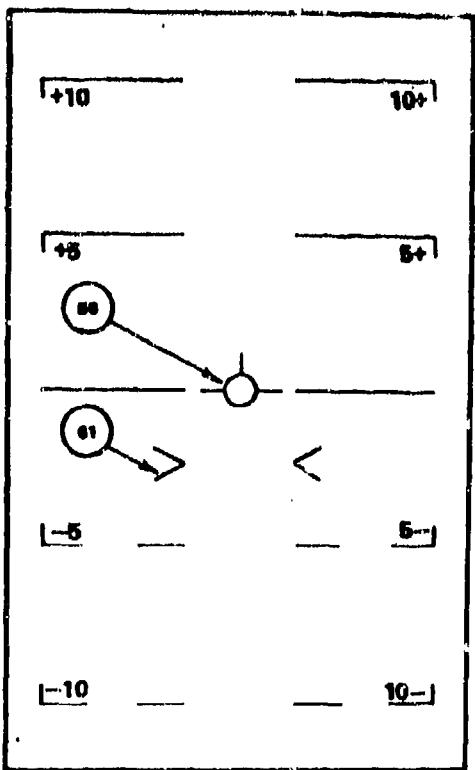


Fig. 26

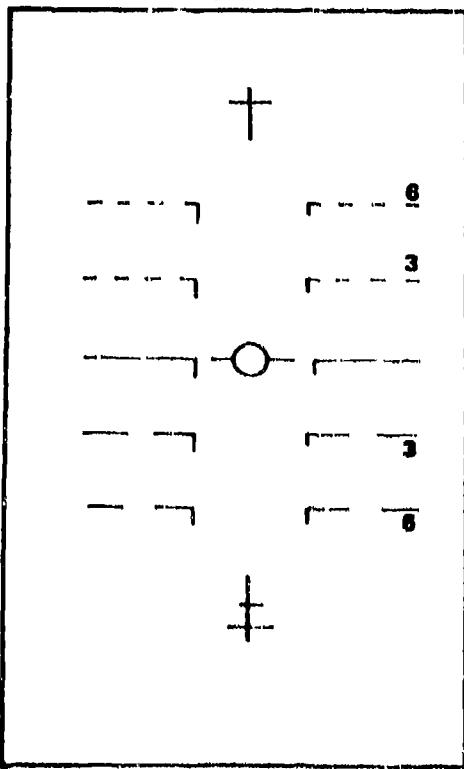


Fig. 27

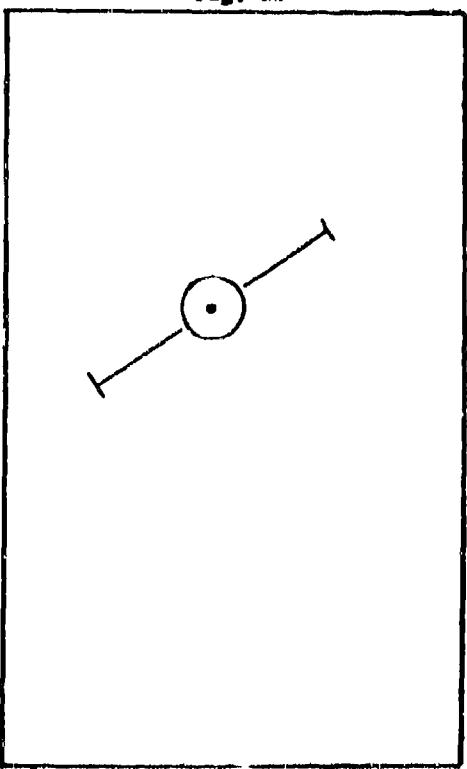


Fig. 28

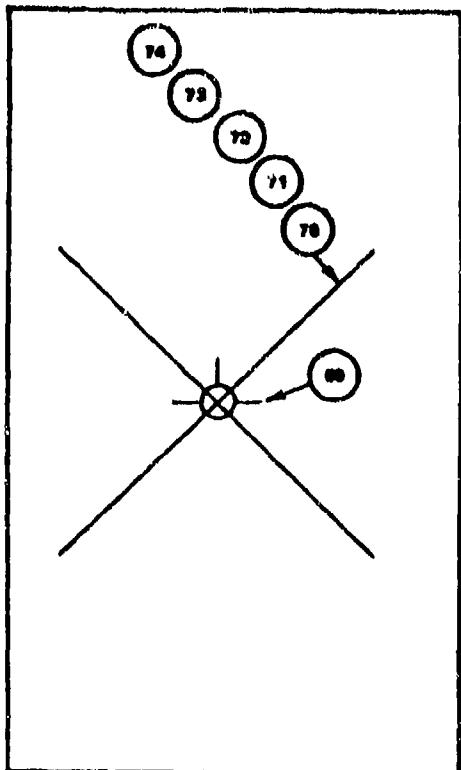


Fig. 29

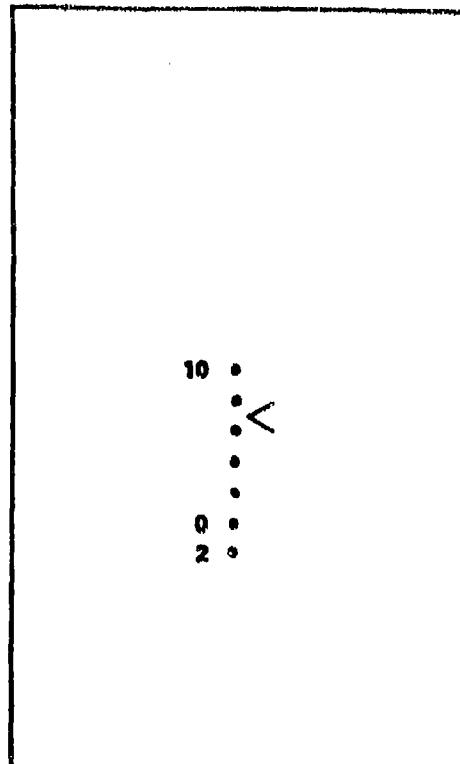


Fig. 30

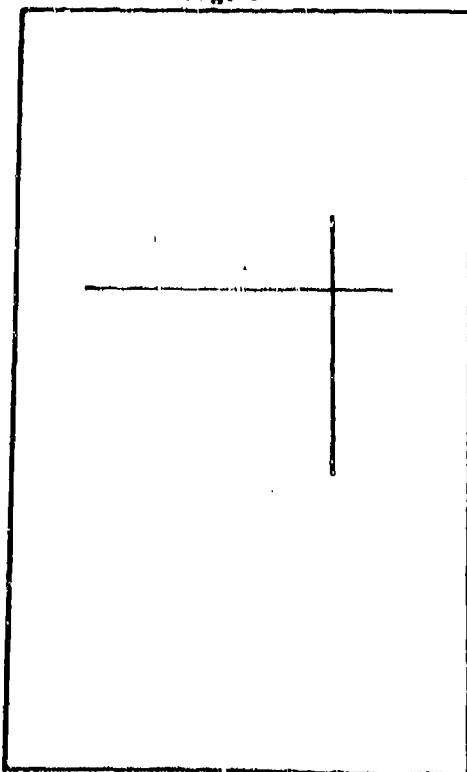


Fig. 31

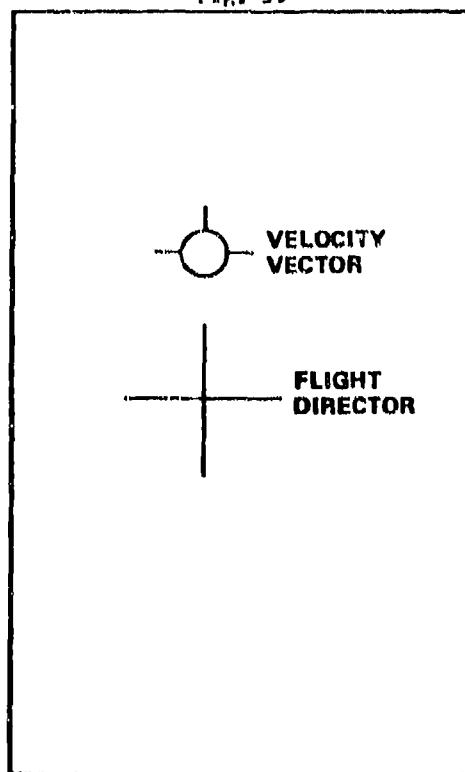


Fig. 32

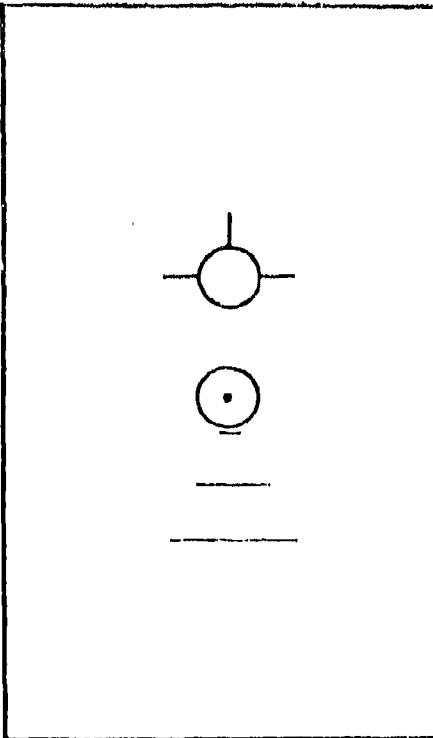


Fig. 33

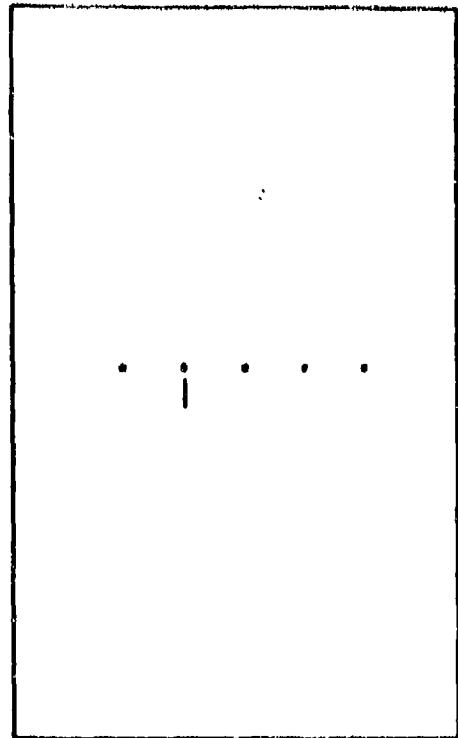


Fig. 34

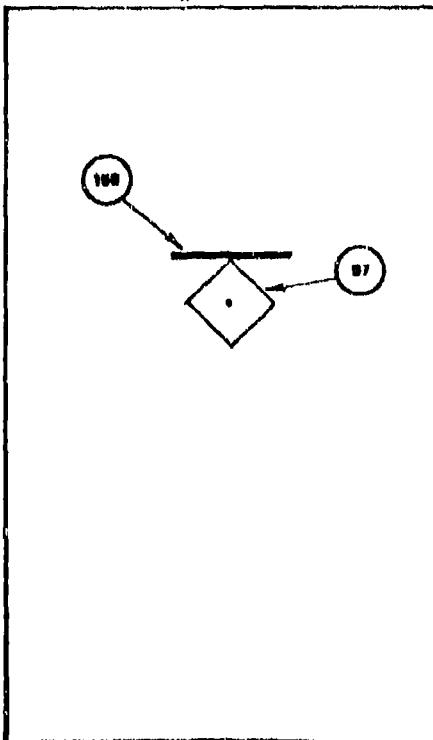


Fig. 35

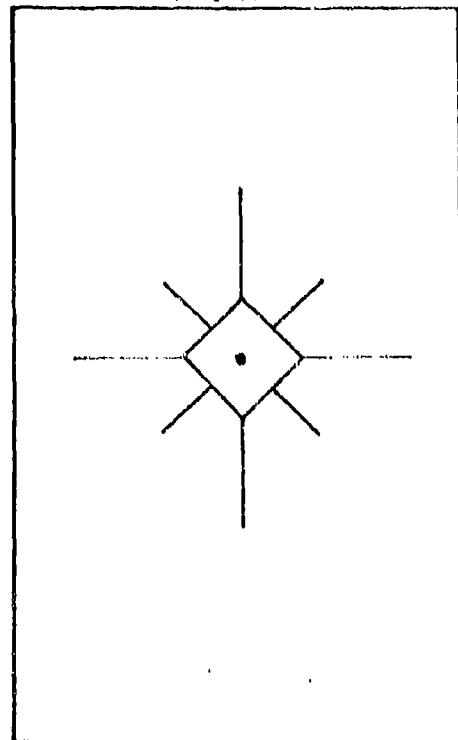


Fig. 36

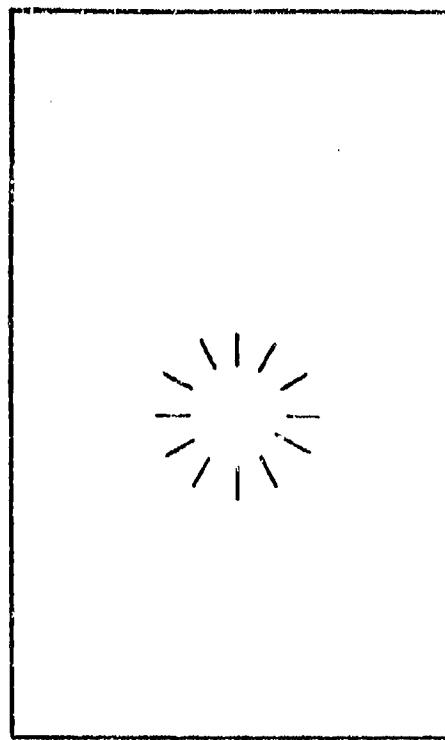


Fig. 37

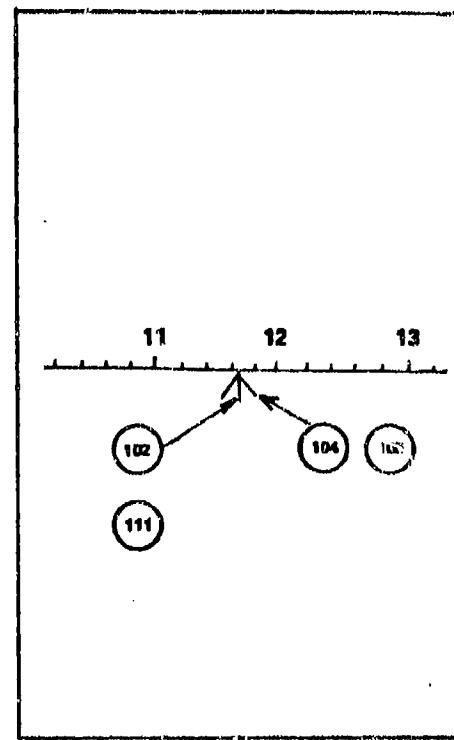


Fig. 38

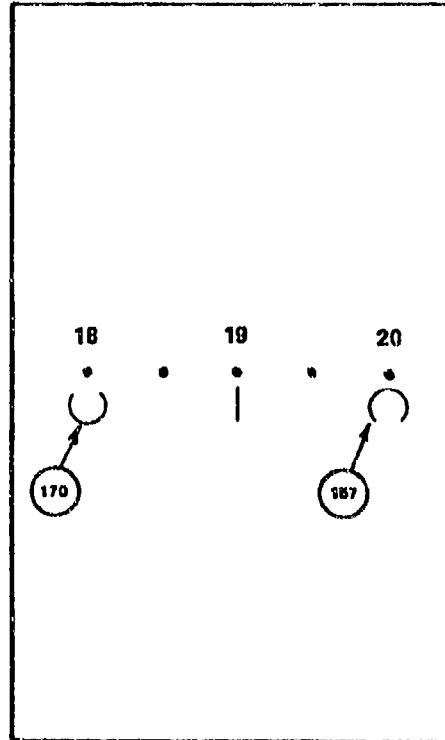


Fig. 39

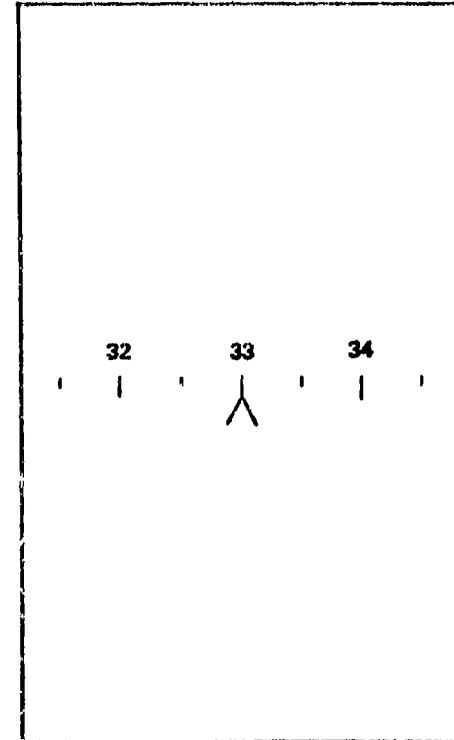


Fig. 40

10      11      12

Fig. 41

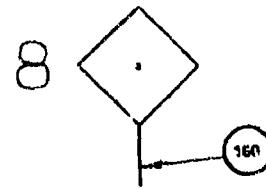


Fig. 43

Fig. 42

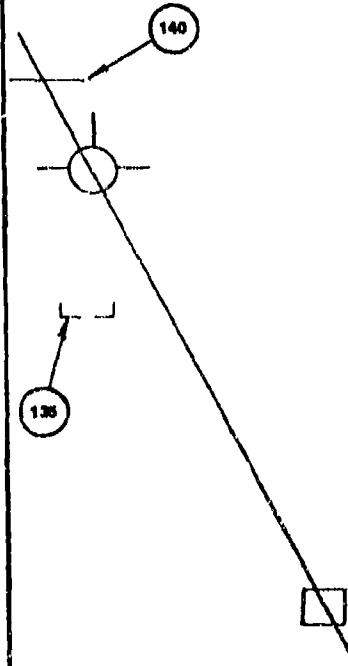


Fig. 44

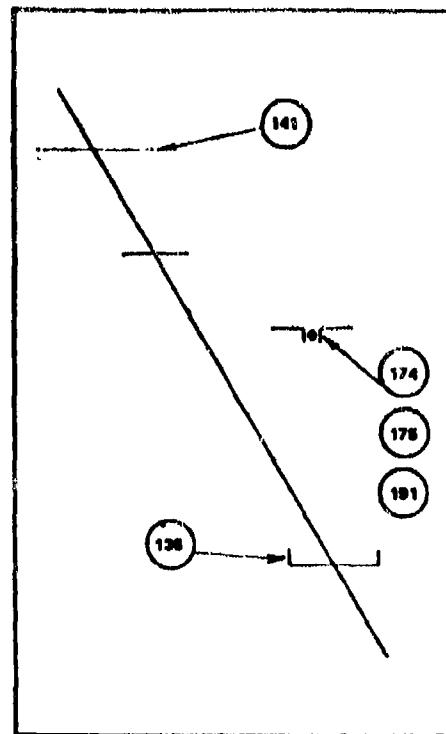


Fig. 45

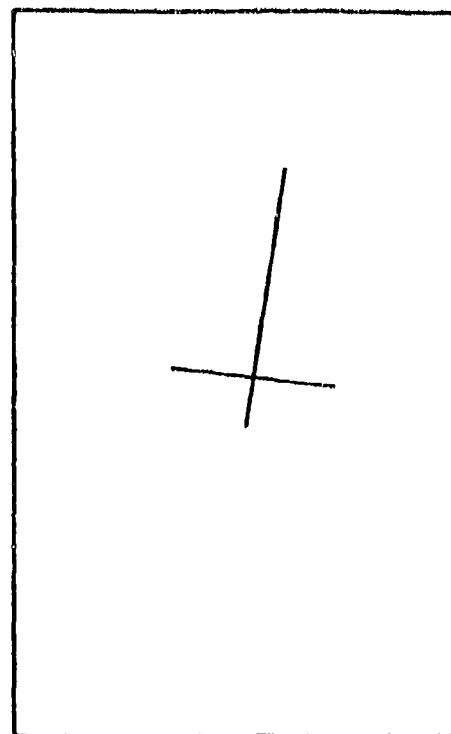


Fig. 46

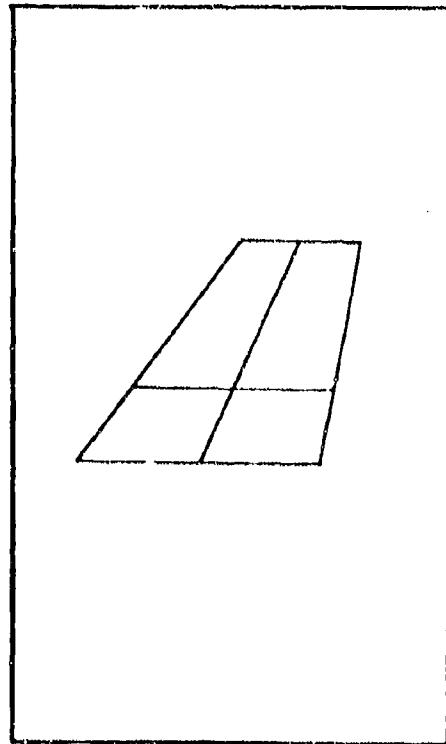


Fig. 47

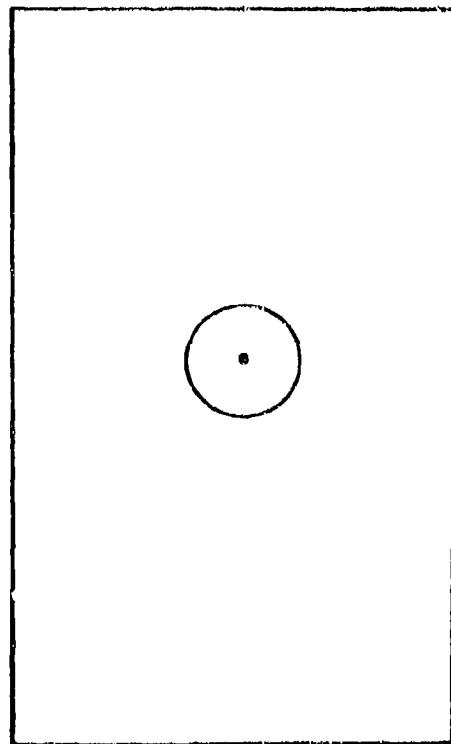


Fig. 48

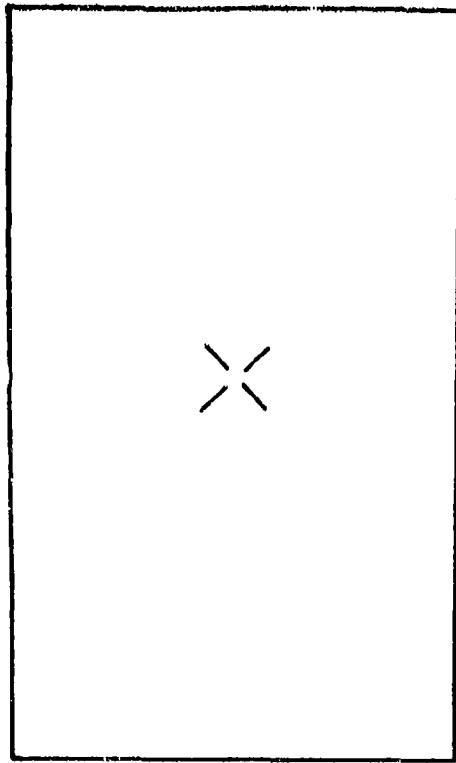


Fig. 49

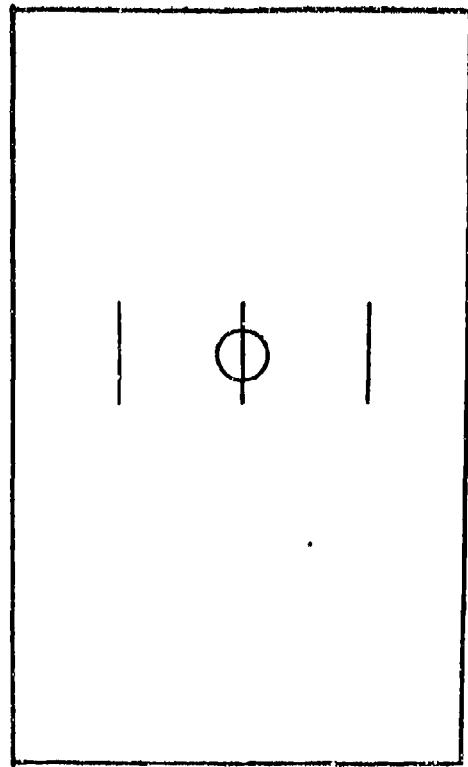


Fig. 50

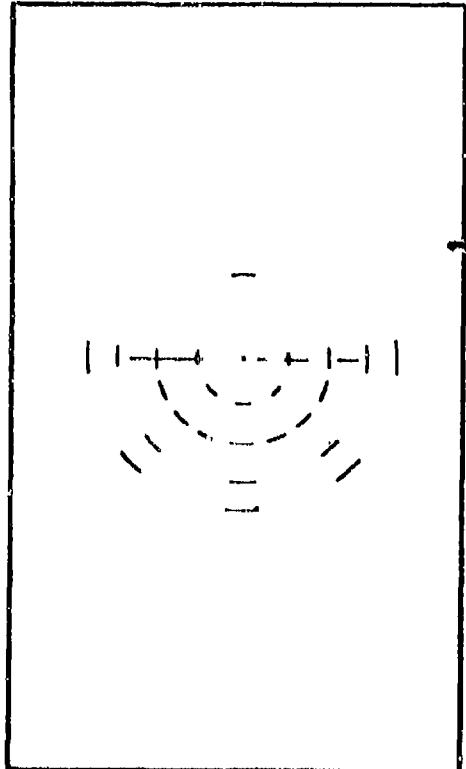


Fig. 51

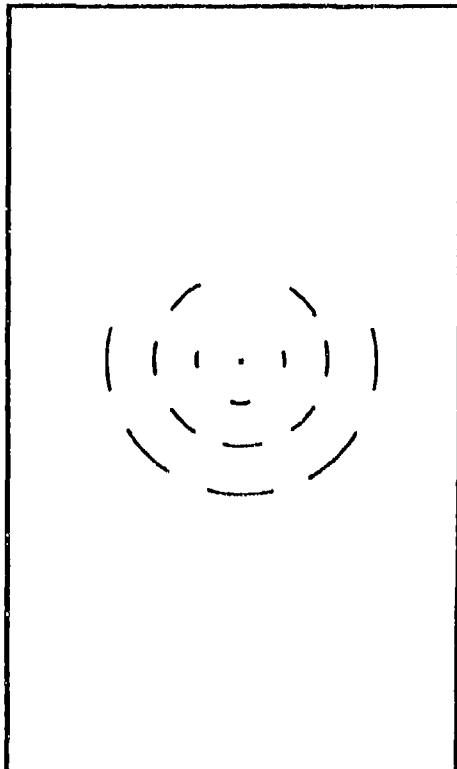


Fig. 52

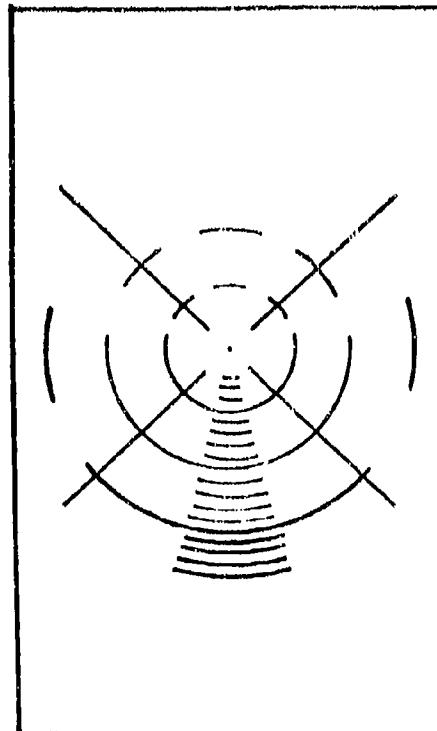


Fig. 53

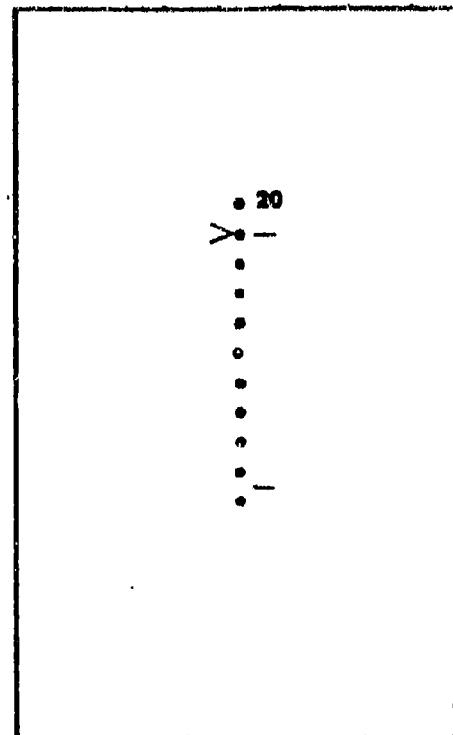


Fig. 54

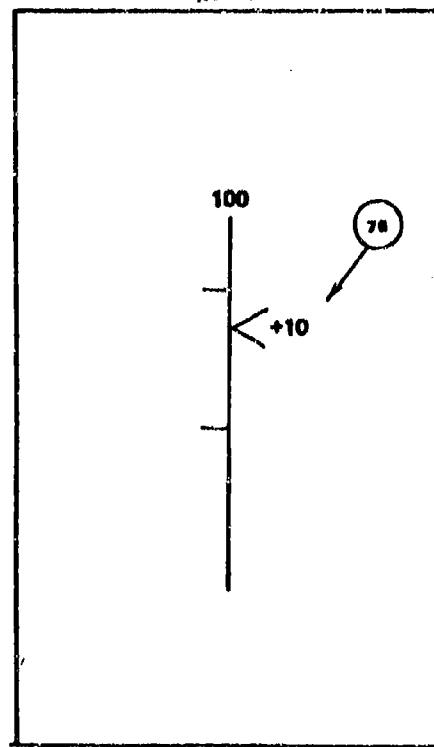


Fig. 55

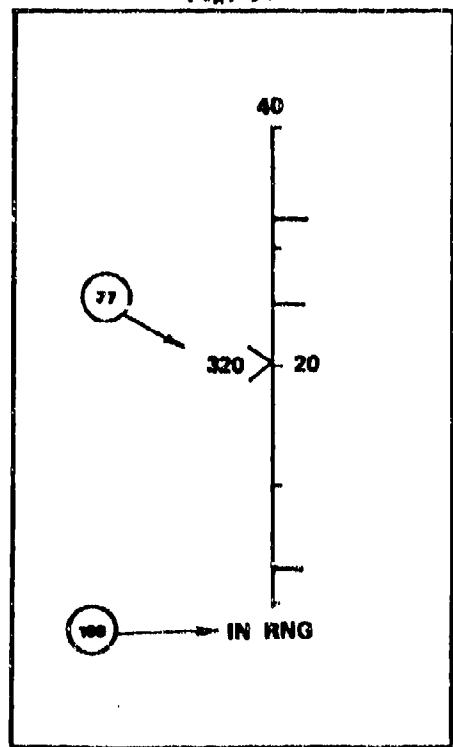


Fig. 56

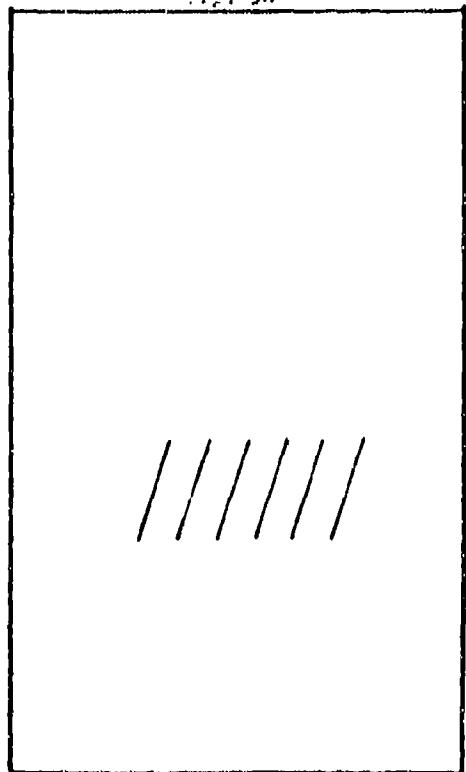
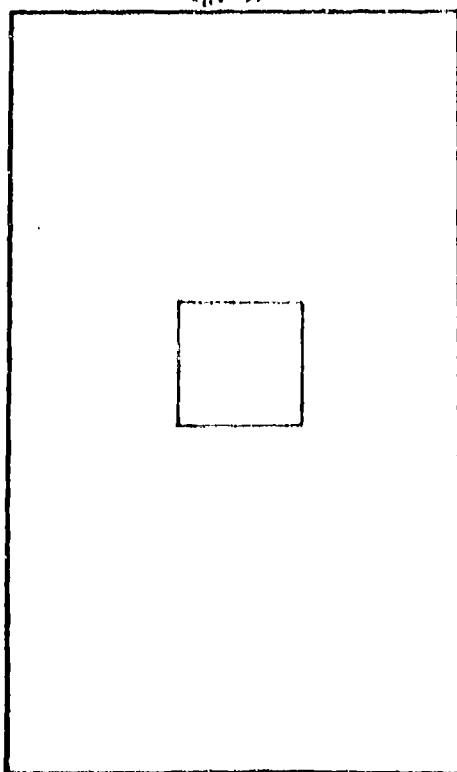
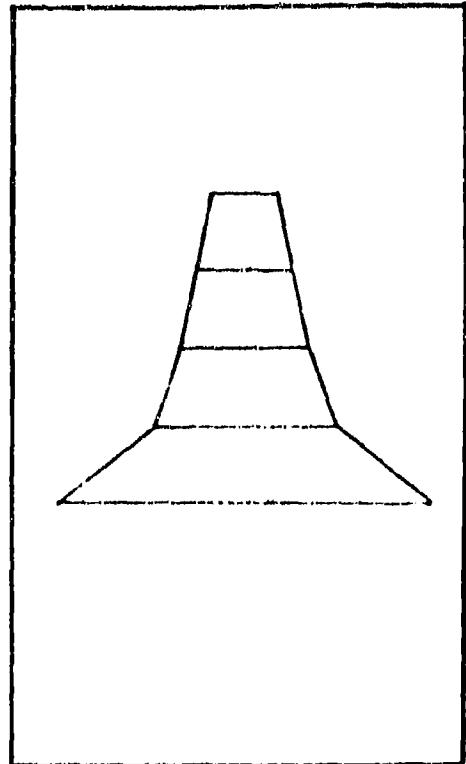
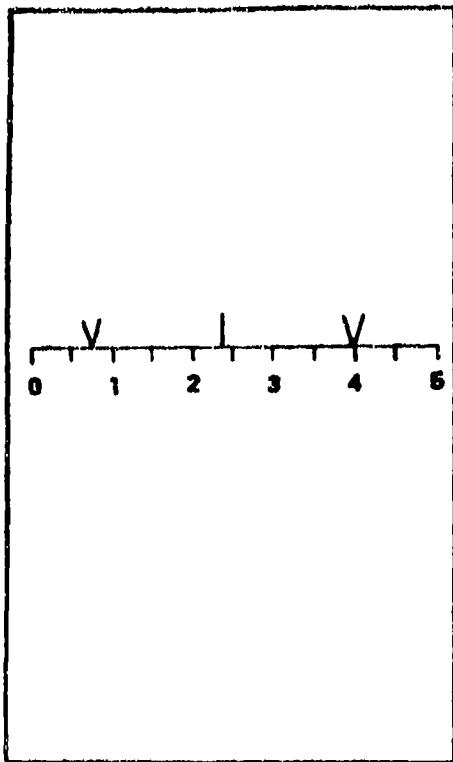
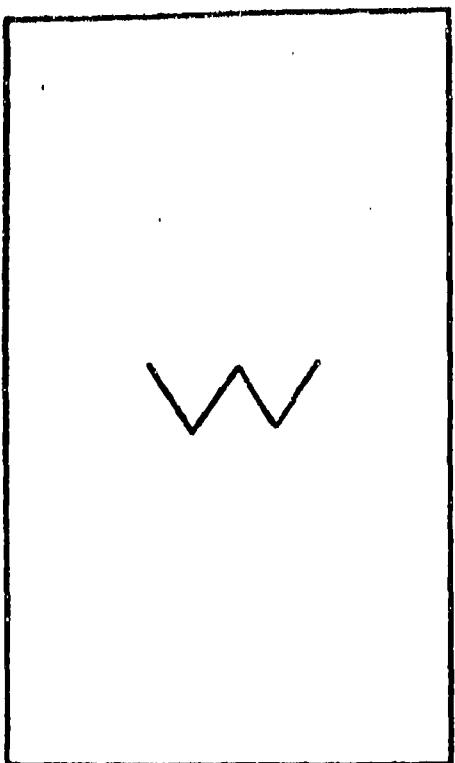


Fig. 59

Fig. 60

NADC-75267-40



"Fig. 61"

## M O D E S

A-7

En Route Navigation  
 Terrain Following  
 Landing  
 Data Link  
 Normal Attack Bomb  
 Normal Attack Offset Bomb  
 Radar Bomb  
 Radar Bomb Offset Bomb  
 Navigation Bomb  
 Gun  
 Rocket

F-5

Guns  
 Missile  
 Manual

F-14

Takeoff/Manual  
 Takeoff/TACAN  
 Cruise/Vector  
 Cruise/TACAN  
 Cruise/Manual  
 Cruise/Destination  
 A/A Manual Gun  
 A/A Optical Track  
 A/A Sidewinder Boresight  
 A/A Sidewinder Normal  
 A/A Phoenix Boresight  
 A/A Phoenix Normal  
 A/A Sparrow Boresight  
 A/A Sparrow Normal  
 A/G Computer-Initial Point  
 A/G Computer-Target  
 A/G Precision Course Direction  
 A/G Computer-Pilot (Bomb)  
 A/G Computer-Pilot (Guns, Rockets)  
 A/G Manual  
 Landing/Vector  
 Landing/All Weather Landing  
 Landing/TACAN

F-15

Attitude Director Indicator  
 A/A (Gun)  
 A/A (Missile)  
 A/G

F-111A

Manual  
 Command  
 Dive  
 Long Angle Drogue Delivery  
 Homing  
 Guns/Rockets

CL-84

Approach  
 Transition

AV-8A

Before AFC 105:  
 V/STOL  
 GEN  
 Navigation  
 REV  
 A/A

After AFC 105:  
 V/STOL  
 Navigation  
 Weapons a  
 Weapons b  
 A/A

MIL-D-81641(AS)

Takeoff/Navigation  
 Terrain Following  
 Bombing  
 Boresight Weapons  
 Guided Weapons  
 Landing  
 Boresight  
 Standby

MIL-STD-884B

Takeoff  
 Navigation  
 Terrain Following/Terrain Avoidance  
 Weapon Delivery  
 Landing

## L I S T   O F   A B B R E V I A T I O N S

A/A	Air-To-Air
A/C	Aircraft
ADI	Attitude Director Indicator
ADL	Armament Datum Line
APC	Airframe Change
A/G	Air-To-Ground
AILA	Automatic Instrument Landing Approach
ALT	Altitude
AOA	Angle of Attack
APPR	Approach
ASE	Allowable Steering Error
AWL	All-Weather Landing
BARO	Barometric
CCIP	Continuously Computed Impact Point
CL	Centerline
COMP	Computer
DIV	Dive
FD	Flight Director
FOV	Field of View
FPM	Flight Path Marker
FRL	Fuselage Reference Line
HOR	Horizontal
IAS	Indicated Airspeed
ILS	Instrument Landing System
INS	Inertial Navigation System
IP	Initial Point

## LIST OF ABBREVIATIONS (continued)

KT	Knot
LADD	Long Angle Drogue Delivery
LDG	Landing
M	Mach
NAV	Navigation
NM	Nautical Mile
PCD	Precision Course Direction
RNG	Range
SEAM	Sidewinder Expanded Acquisition Mode
SPEC	Specification
SYM	Symbolic
TA	Terrain Avoidance
TAS	True Airspeed
TCN	TACAN
TF	Terrain Following
TGT	Target
THERMO	Thermometer
TO	Takeoff
TRAN	Transition
V/STOL	Vertical/Short Takeoff and Landing
VV	Velocity Vector
WPN(S)	Weapon(s)

R E F E R E N C E S

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2. F-5 Technical Orders; T. O. 1F-5E-1.
3. Preliminary NATOPS Flight Manual F-14A; NAVAIR 01-F14AAA-1; 1 Nov 1973.
4. F-14A Programmable Display Generator HUD Symbology/Interface Requirements; Grumman Aerospace Corp Report No. AS1-232-R-73-7; 22 Oct 1973.
5. F-15 (untitled)
6. F-15 Product Support Digest; Ready Room pp 8-12.
7. F-111A Technical Orders; T. O. 1F-111(V)A-1.
8. Gold, T. and Walchli, R. M.; Head-Up Display for All-Weather Approach and Landing of Tilt-Wing V/STOL Aircraft; AIAA Paper No. 74-952; 12 Aug 1974.
9. NATOPS Flight Manual AV-8A; NAVAIR 01-AV8A-1; changed 15 Feb 1974.
10. MIL-D-81641(AS); Display, Head-Up, General Specification for; 26 Jun 1972.
11. MIL-SID-884B; Military Standard Electronically or Optically Generated Displays for Aircraft Control and Combat; Cue Information; 4 Jan 1972.